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ABSTRACT

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LOW-INFERENCE OBSERVATIONAL CODING MEASURES AND TEACHER EFFECTIVENESS[1]

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Abstract

Low-inference measures of teacher process variables from two behavioral observation systems were taken on a sample of 31 teachers selected because of their consistency in producing student learning gains on the Metropolitan Achievement Test and were correlated with student outcome measures Correlations showing the strength of relationships with success in producing student gains are presented. Data represent findings from the first year of a two-year study attempting to isolate correlates of effective teaching.

Low-Inference Observational Coding Measures and Teacher Effectiveness

Until recently, teacher effectiveness research attempting to link teacher behavior in the classroom to student achievement outcome measures produced generally disappointing results. Reviews of literature (Mitzel and Gross, 1958; Morsh and Wilder, 1954) unhappily concluded that efforts in this area had not led to the identification of specific teacher behavior which was reliably linked to student achievement gains.

These results led many to conclude that teaching is an art rather than a science, and that attempts to identify universally effective teaching behavior or to identify "effective teachers" were fruitless. However, more recent reviews (Flanders and Simon, 1969; Rosenshine and Furst, 1971; Rosenshine, 1971; Dunkin and Biddle, 1973) provide greater cause for optimism, concluding that teaching behaviors related to teachers' general effectiveness are being identified more consistently in recent studies. Although the positive results usually involve relatively weak correlations between teacher process measures and student outcome variables, several studies have agreed in identifying certain teacher variables as aspects of general effectiveness.

One reason has been the use of better observation systems. Much early research used systems developed by psychologists to study group dynamics. Generally, such systems are not very appropriate for teacher effectiveness research. They were not developed for use in the classroom, and usually were not constructed specifically to determine whether a teacher met specified objectives, either in his teaching behavior or in the learning of his students.

Thus one reason that process-product research in teacher effectiveness has improved of late has been the appearance of new systems and improvements in some of the older systems (Flanders, 1970).

Despite these improvements in methodology and other signs of progress in this line of research, a new threat to the search for effective teaching behavior arose with the publication of Rosenshine's (1970) review of stability across time in teachers' abilities to produce student learning gains. After reviewing a large body of literature, Rosenshine could locate only five studies which contained data on stability in teacher effectiveness over long time periods in producing student learning gains. Of the five, only two seem immediately generalizable to the typical school situation. One involved Air Force instructors teaching eight hour airplane hydraulics courses to Air Force recruits, and two of the others involved experimental studies where teachers were not using their typical methods of instruction. Thus only two of the five studies involved ordinary school teachers teaching in their normal ways. One of these studies did not give an exact stability coefficient but suggested that stability from one year to the next was quite low, while the stability coefficient from the other study was .09. These figures quite obviously suggest that teacher effectiveness in producing student learning gains is not a stable "trait," that a teacher who produces large gains in his students this year is not necessarily going to do the same the next year. Such results, if they accurately reflect the general case, render the improvements in classroom observation methodology insignificant, since there is little point in process-product teacher effectiveness research if teachers are not stable from one year to the next in their relative success in producing student learning gains.

The present study

The data to be presented are part of a large scale study which attempts to address itself to several of the problems described above. The study includes several methodological innovations specifically designed to overcome some of

the difficulties in earlier research. It has involved two major parts to date. The first, a study of stability in teacher effectiveness in producing student learning gains, established that such stability is much more evident than the two studies mentioned above would suggest, at least in certain teachers (Brophy, 1972). The second part of the study is a long term and multifaceted attempt to identify the personal and behavioral correlates of teaching effectiveness in a sample of teachers known to be stable in their relative effectiveness in producing student learning gains.

Stability in teacher effectiveness

The stability aspect of the study involved 88 second grade teachers and 77 third grade teachers from an urban school district. Study of stability was predicated upon the following two basic assumptions:

1. In evaluating the impact of schooling on student learning, the teacher, and not the school, is the appropriate unit of analysis. This point would seem to be intuitively obvious. However, the study that formed the basis for the original Coleman Report (Coleman, et al., 1966), as well as several studies done since (notably Jencks, et al., 1972), have used schools rather than teachers as the unit of analysis. This method is indirect at best. Although one school might be more effective than another because it contains a greater percentage of highly effective teachers, the teachers, and not the school, are the effective causal mechanisms producing student learning gains. This would be merely a minor technical point except for the fact that such studies have recently been used as the basis for claims that schools do not have differential effects. This in turn leads to the conclusion that a school's effectiveness is determined by the socioeconomic status of its student population rather than by

the skills of its teaching staff, and the latter at least implies that schools should not be held accountable for or expected to accomplish much with students from low socioeconomic backgrounds.

The latter conclusions simply do not follow from the data. The studies used to "support" them have failed to directly measure teaching effectiveness. They have used only indirect presage measures (teacher examination scores, average years of experience of the teaching staff, percentage with advanced degrees, student/teacher ratio, per pupil expenditure, etc.). None have included process observations of teacher behavior, even though the indirect indices mentioned above either are already known to be unrelated to teacher effectiveness or have never been studied in relation to it. If we assume that teachers of varying effectiveness are randomly distributed throughout a school system, or, as is more probable, that the better teachers are more often assigned to the higher socioeconomic schools, it is hardly surprising that studies using the school as the unit of analysis come out with the kinds of results that they do. To conclude from such data that schools (and, by implication, teachers) have no effect is patently fallacious. It is more than a merely harmless error, however; it appears to have already resulted in cutbacks in funding for schools and for educational research in some quarters. As reanalyses of the Coleman data showed (Mood, 1970), and as data from the present study support, teachers <u>are</u> differentially effective and <u>do</u> make a difference (Veldman and Brophy, 1973).

2. In addition to using the teacher as the unit of analysis, studies of stability in teacher effectiveness must include the most appropriate types of teachers if they are to be optimally useful. Many of the studies previously done, including some of those reviewed by Rosenshine, involved teachers who were working in a special experimental program. It is reasonable to suppose that

such teachers are less stable in their teaching behavior than teachers working naturalistically in typical and familiar settings.

In addition, several other studies have included, or even have been confined to, student teachers or teachers in their first year or two of teaching experience. The classroom behavior of such teachers is known to be unstable; they are in the process of learning how to operate in the classroom and have not yet established a stable teaching pattern or "style." Thus inclusion of teachers in a study of stability in teacher effectiveness is inappropriate if the intention is to generalize the data to the average or typical career teacher.

Teacher selection

Consistent with the two preceding assumptions, it was decided to restrict the study to teachers who had been teaching at the same grade for at least three consecutive years, avoiding student teachers and brand new teachers, and to use the teacher rather than the school as the unit of analysis. Resource limitations demanded that the study also be restricted to only two grade levels. Partly out of an interest in early education, and partly on the assumption that teachers probably make a greater difference in the learning of younger students than older ones, because the younger students are less capable of overcoming the effects of inadequate teaching through their own learning efforts than older students, the decision was made to work at the early elementary grades. The first grade was rejected for lack of an adequate pretest. The children did take readiness tests at the beginning of first grade, but these are known to be unreliable and heavily influenced by the child's preschool experience, especially the stimulation he receives at home (Hess, 1970). Thus the second and third grades were selected for study.

The school district contained 50 elementary schools with about 275 teachers working at grades 2 and 3. Of these, 88 second grade teachers and 77 third grade teachers met the selection criteria mentioned above. The district administered the Metropolitan Achievement Tests each fall. Residual gain scores from 3 language arts and 2 math subtests were used for determining teacher effectiveness. Data from Title I and non-Title I schools were treated separately, because slightly different forms of the MAT were used in these two types of schools. Second and third grade data were also treated separately, yielding a total of 4 separate data sets.

For each data set residual gain scores on each subtest were computed for each student within sex and within each of the three years, using the student's prescore as a covariate. Student residual gain scores were then collated by classroom, and a mean residual gain score was computed for each teacher for each subtest for each of the three years included in the study. Intercorrelations among these mean residual gain scores were then computed.

The data show generally high correlations across subtests within years, and moderately high stability within subtests across years (Brophy, 1972). Within years, the three language arts subtests (Word Knowledge, Word Discrimination, and Reading) correlate highly with one another, and usually also correlate highly with arithmetic reasoning. Arithmetic computation typically correlates highly only with arithmetic reasoning. The fact that the correlations across subtests within years are quite high and generally higher than the stability coefficients for single subtests across years illustrates that even when statistical procedures are used to adjust scores for student performance on the pretest and for other variables, a yearly class or cohort effect exists. This may represent unmeasured class cohesiveness, motivational factors, student

or teacher absenteeism, or other factors that operate within but not across years. This general yearly effect suggested by the high correlations across subtests within years was verified in an informal analysis of each teacher's set of residual gain scores. Only about 15 of the teachers showed a consistent tendency to produce higher residual gain scores in language arts than in math or vice versa.

Despite this yearly cohort effect the stability coefficients reflecting teacher consistency in producing student learning gains were notably higher than those reported in the 5 long-term studies reviewed by Rosenshine (1970). While not high enough to justify their use as teacher accountability criteria, they were high enough to enable us to identify consistent teachers for further study.

Stability coefficients were mostly insignificant in one of the data sets, but mostly significant in the other three. In the first set (N's=22-26), they ranged from -.12 to .49, with a median of .25; in the second set (N's=36-42), they ranged from .33 to .63, with a median of .42; in the third set (N's=20-24), they ranged from .19 to .78, with a median of .39; and in the last set (N's=42-44), they ranged from -.07 to .65, with a median of .40 (Brophy, 1972). About half of the 3-year patterns were linear, and the remainder were non-linear. Slightly more than half of the linear patterns were constant, while the others showed patterns of either improvement or deterioration. Thus, when the sample is restricted to teachers who have had several years of experience at the same grade level, the stability coefficients obtained are higher than those previously reported.

Analyses of teachers' patterns across subtests and years revealed additional information. First, most teachers were relatively equally successful with

boys and girls; only four of 165 consistently produced higher residual gains in one sex than the other (although girls generally outgained boys, as usual). Thus student sex did not significantly affect teacher effectiveness.

Also, no evidence of schools' effects could be found. High- and low-effective teachers were not concentrated in certain schools. There also was no evidence of a "rebound" effect within schools (a combination of low-effective second grade teachers with high-effective third grade teachers, or vice versa, which might mean that the data on the third grade teachers were artifactual). These data reinforce the point made earlier that teachers, and not schools, are the appropriate units.

Finally, many teachers showed constancy across subtests within years as well as within subtests across years, so that teachers who produced generally consistent gains across subtests and across the two sexes could be identified. The thirty-one teachers included in the process observation study the first year were selected from this consistent group.

Studying consistent teachers

The second step in the research involved intensive study of the classroom behavior of these generally consistent teachers. Since such teachers have already demonstrated consistency in their ability to produce student achievement gains, and since they have all had several consecutive years of experience teaching at the same grade level and have probably, therefore, attained a stable pattern or "style," process-product research designed to identify the behavioral correlates of teaching effectiveness seemed to be particularly promising on such a sample. Naturalistic observations in these teachers' classrooms were therefore undertaken. At this writing, one year of naturalistic research has already been conducted, and a second year is presently completed.

The first year's research was conducted on a sample of 31 teachers divided roughly evenly between Title I and non-Title I schools and between grade 2 and grade 3. The data collected during this year included process measures of classroom behavior and personality and attitude data from pencil and paper tests. The process measures included both low-inference behavioral coding and high-inference ratings by classroom observers. The present paper presents the findings from the two low-inference systems used. Each teacher was observed for two mornings and two afternoons during the spring semester, totalling about eight hours of observation. The main low-inference coding was based on the Brophy-Good Dyadic Interaction System (Brophy and Good, 1970), although the original system was expanded to include certain additional variables, particularly classroom management variables based on Kounin's (1970) classroom management research. This system picked up such variables as teacher vs. student-initiated interactions, types of interactions (academic, procedural, or behavioral-disciplinary), difficulty level of teacher questions, quality of student responses to those questions, quantity and quality of teacher feedback and evaluative reactions to student responses and student work, and the teacher's methods and general effectiveness in handling classroom management and disciplinary problems.

This system was selected (and adapted) for use as the main low-inference data collection instrument because it subsumes most of the information included in other major systems (although in slightly different form) and includes several features which do not appear in other systems, but are believed to be important aspects of teaching in the primary grades.

A second behavioral coding instrument, developed by staff member Nancy Moore, was used on a subsample of 5 high-effective and 5 low-effective teachers who were observed twice during mornings when they did most of their group in-

struction. This instrument was specially constructed to get at group instruction methodological variables, such as lesson composition, sequence, and clarity; teacher questioning patterns; and handling of seatwork assignments. This system was included to enable low-inference coding of certain group instructional behaviors not included in the other system.

Both of these instruments involve low-inference coding of discrete classroom behaviors. Data were also collected with a pencil-and-paper test battery (Peck and Veldman, 1973) and with a number of high-inference rating scales and checklists (Evertson and Brophy, 1973).

Observer training and reliability

Observers using the expanded Brophy-Good system were trained according to the sequence outlined in Brophy and Good (1970), which includes reading the manual, responding to questions about coding decisions, coding videotapes, and coding classrooms similar to those in the study. Each observer continued training until he reached an 80% agreement criterion, using a strict definition in which % agreement = number of coding decisions made by both coders and agreed upon divided by itself + number of coding decisions not agreed upon + number of codings made by the first coder but not the second + number of codings made by the second coder but not the first.

This is a more stringent agreement criterion than is typically used; however, it is not impossible to attain in even a comprehensive low-inference coding system, and the probable societal implications of data from this research make it imperative that coding be as accurate as possible. Observers know the nature of the research but had no information concerning teachers' effectiveness scores, so that their coding could not be biased by this factor.

Even though coders reached a high level of reliability during training, they worked in pairs throughout the study as an additional safeguard against coder bias. Differences between the two coders were resolved by averaging in computing teachers' scores for each observation. Agreement data for each coding decision made by coders using this system are given in Table 1. Note that many of these are lower than the 80% level reached in training, although most are satisfactorily high, given the strictness of the criterion. Most disagreements occurred because one coder missed a codable behavior during a rapidly paced sequence (not because both coders coded but disagreed). This coder agreement was generally quite satisfactory, and the disagreement which did exist was due largely to the difficulty of "catching everything" during bursts of activity rather than to differences in the application of category definitions and/or bias toward or against teachers.

RESULTS

Expanded Brophy-Good System (See Appendix A)

The results from the process variables in the expanded Brophy-Good System are presented in Table 2. The table contains correlations between 141 process measures (subdivided into 17 clusters) and mean residual gain scores for the five MAT subtests. Correlations are presented separately for interactions which occurred during the morning in whole class activities, interactions that occurred during the afternoons in whole class activities, and interactions that occurred during reading groups. This allows some indication of the degree to which the relationships generalize across three different classroom settings.

Also, three coefficients are presented for each relationship. The top coefficient is for the entire group of teachers (all teachers for whom scores were available), while the bottom two correlations are for the teachers in Title I

schools (on the left) and in non-Title I schools (on the right). Probability values are indicated by underlining the coefficient once when probability is between .10 and .05, and underlining it twice when probability is below .05. These relatively lenient probability values were selected in place of the more typical .05 and .01 levels in view of the small N. Maximum N's are 31 for the entire sample, 13 for Title I, and 18 for non-Title I. The actual N's are sometimes lower, particularly in clusters E, F, G, J, L, and M. These clusters deal with aspects of classroom interaction that were rarely or even never observed in some classrooms. The findings will be discussed on a cluster-by-cluster basis.

Cluster A concerns the teacher's method of selecting respondents to questions. As expected, a teacher tendency to preselect the respondent before asking the question was negatively correlated with achievement gains. This confirms the typical advice given to teachers that better attention to questions will result if the teachers ask the question first (and presumably allow some time for thinking about the answer) before selecting a respondent. The data regarding calling on volunteers are the first of many to be discussed in the paper which show a difference in effectiveness in Title I compared with non-Title I schools. Teachers in Title I schools who called on volunteers tended to be more successful in producing student learning gains, but in non-Title I schools this behavior was negatively correlated with effectiveness. Thus teachers working in Title I schools need to "go after" students more systematically and proactively to get them to respond in public response opportunity situations, and not merely confine themselves to calling upon students who raise their hands. The most probable reason for this difference is a difference in student hand-raising response rates. Most students in non-Title I schools are eager to respond and raise their hands frequently, so that the teacher will be spreading around response opportunities even if she calls primarily upon those who have their hands raised. However, a teacher

who behaves this way in a Title I school is likely to end up calling on the same few students for the majority of the public response opportunities. To prevent this domination of public response opportunities by the brightest and/or best motivated students, teachers in Title I schools need to frequently call upon non-volunteers.

The data concerning students calling out answers are mixed, with the only significant relationship being a negative one. The most likely explanation is that this reflects classroom control: teachers probably have poor control in classrooms where calling out is especially frequent. This will be checked out in subsequent analyses in which teacher process variables will be correlated with one another.

The data of cluster B concerning the difficulty level of the questions that the teachers asked did not fall into any easily interpretable pattern. This is most probably because at second and third grade the vast majority of questions are of the product and choice variety, with very few process questions. Level of questions is probably a more important variable at higher grade levels. The significant relationships that did exist were all in the Title I schools, but they were mixed in direction. The data for general class discussions show negative relationships for process questions and positive ones for choice questions, suggesting that in these settings teachers in Title I schools need to take care to keep the discussion at a level that the students can understand and deal with. The data for reading group questions are reversed, however. Here the majority of the process questions dealt with comprehension of the story being read or with word attack skills. Apparently the questions in this context were well within the grasp of the students in the Title I schools, so that they benefited by the stimulation of process questions, and were less stimulated by choice questions which may have been too easy for them.

The data in Cluster C concerning the quality of the children's answers to

questions provide several interesting findings. First, they contradict the advice of errorless learning advocates and support the idea that students should be challenged with questions at the threshold of their knowledge. This was especially true for students in non-Title I schools, where the percentage of correct answers regularly was negatively correlated with student learning gains. In short, teachers should challenge bright and well-motivated students and not confine themselves to questions that the children can answer with ease. This generalization does not apply to Title I schools, however, where the pattern of relationships between student learning gains and the frequency of correct and incorrect answers was more mixed. In other words, there is a greater danger here of producing undesirable effects by asking questions that are too difficult, especially during whole-class discussions (vs. reading groups). It had been expected that teachers whose students actively said, "I don't know," when they did not know an answer would be more successful than teachers whose students made no response when they did not know an answer, but this was not the case. The tendency to say "I don't know" was positively correlated with student learning gains, but, with one exception, failure to respond was also positively correlated, at least in Title I schools. This may mean that teachers should frequently ask questions, that they should ask difficult and challenging questions (especially in non-Title I schools), or both.

When viewed in a somewhat different context, the data for Cluster C suggest that positive expectations are an important component of teaching effectiveness. That is, the effective teachers appear to be those who challenge the children with difficult questions and who are undeterred by incorrect answers, "don't know," or failure to respond.

The data in Clusters D through H, dealing with teacher reactions to student answers or failure to answer, will be discussed in combination. First, the data

on teacher praise flatly contradict the advice given in virtually all teacher training books and materials. Praise had relatively few significant correlations with student learning gains, and the correlations which were significant were all negative. Thus frequent teacher praise seems to be unimportant as a motivating incentive, and overly frequent praise appears to actually interfere with learning progress. This appears to be true for both Title I and non-Title I schools. Furthermore, the data do not reflect a satiation effect; praise was infrequent, even following correct answers. In short, despite the near-universal stress placed upon the importance of praising children's responses, praise correlated negatively with student learning gains.

Criticism for calling out (correct) answers correlated positively in non-Title I schools but negatively in Title I schools. Like the data in Cluster A, this probably represents the difference in student eagerness to respond. If the students in non-Title I schools are all eager to respond, it may be important for teachers to insist that the class wait for her to call on someone and respect that student's right to answer the question without being interrupted. In contrast, if students in Title I schools are generally unresponsive, allowing or even encouraging calling out answers might be one way for the teacher to improve motivation.

With two exceptions, all significant correlations involving teacher failure to give feedback were negative. This underscores the imporatnce of teachers giving feedback to students to tell them whether or not their answers were correct. The exceptions occurred for two measures of teacher reactions to "don't know" or no response in the Title I schools. Although it cannot be determined from the data, it is likely that the vast majority of the instances occurred following no response, in situations in which the teacher was moving at a brisk pace and primarily concerned with eliciting the answer rather than with dealing with an in-

dividual student at length. In these situations (rapidly paced drills or reviews, for example), it sometimes makes sense for the teacher to move on to someone else when a child does not respond, in order to keep the lesson moving at an appropriate pace. Thus failure to give feedback to students in such situations is understandable. Nevertheless, we were surprised that these relationships were strong enough to produce a significant positive correlation. If it is true that failure to give feedback does occur mostly during rapidly paced question sequences, it is possible that this finding involves a "proxy variable." That is, perhaps the real relationship is not between failure to give feedback and student learning gains but between rapidly paced question sequences and student learning gains.

Although less surprising than the data on praise, the data on criticism of student responses also did not conform to our expectations. We thought that criticism of student error or failure to respond would be negatively correlated with student learning gains, but the results were mixed. Criticism simply was not an important variable in the Title I schools, where it never correlated significantly with student learning gains, either positively or negatively. In contrast, the data for non-Title I schools showed several significant relationships, but they were about equally divided between positive and negative correlations. Our best guess is that the positive correlations represent justified teacher criticism of poor responses that resulted from inattention or misbehavior, while the negative relationships represented unjustified critical overreaction by the teachers. However, the available data do not allow a test of this interpretation.

The frequency with which the teacher gives process feedback (giving a detailed explanation rather than merely supplying the correct answer) showed many significant correlations with student learning gains, all but one positive. This underscores the importance of teachers' making an effort to be sure the children

truly understand the material, and this frequently will mean giving a detailed explanation or demonstration rather than just supplying the correct answer. The only significant negative relationship occurred in the reading groups in Title I schools. This may tie in with the data in cluster B on question difficulty. Taken together, the data reviewed so far suggest that Title I students have difficulty in general class discussions, where it might be important for the teacher to err on the side of "over teaching," but that they have little difficulty with the kinds of questions asked during reading groups, so that "over teaching" is a liability rather than an asset in this context.

The remaining teacher reaction variables all concern the question of whether the teacher provides the answer or allows another child to provide it when the student has not been able to respond correctly, or whether instead she pursues the issue by repeating the question, rephrasing or giving a clue, or asking a new question. The frequency with which the teacher gives the answer herself correlated mostly positively with student learning gains, while the frequency with which teachers called on someone else or allowed other students to call out the answer correlated negatively. These data suggest that if the teacher is going to supply the answer to the student, she should do so herself (thereby remaining with the student and bringing the interaction to a positive closure) rather than simply move on to another student or allow another student to call out the answer.

As an alternative to supplying the answer, the teacher can stay with the student and attempt to get the answer from him or ask him a new question. The data on these variables are mixed. Concerning asking a new question following an initial correct response, most of the significant correlations are from Title I schools. They are negative in direction for general class discussion periods but positive for reading groups. The negative correlations tie in with our earlier interpretation that it is especially important in Title I schools to

spread public response opportunities around the class rather than confine them to a few individuals. However, this apparently is not true for reading groups. The positive correlations here might simply represent a questioning pattern (such as asking an easy question first and then following up with a more difficult question), or it may represent a more psychologically meaningful relationship between staying with a student following a correct answer and learning gains in a reading group context. These positive correlations in reading group behavior are difficult to interpret in any case, because they relate teacher behavior in reading groups to student learning gains on the two mathematics subtests! The one significant correlation involving the non-Title I schools is negative, and the general pattern suggests that it is unwise for teachers in these schools to stay with students who provide correct answers to reading group questions and better if they move along to another student following a correct answer.

The data on persistence in seeking an answer following failure to respond correctly are also mixed, although they do allow one generalization: if the teacher elects to stay with a student in an attempt to elicit a response, it is generally better if she provides a clue, rephrases the question, or asks a different question than if she simply repeats the original question. This seems to make intuitive sense, since there seems to be little point in simply repeating a question unless the student did not hear it the first time or the teacher was simply trying to pump him to respond. Where the student has clearly heard the question and has responded incorrectly or does not know the answer, however, simply repeating the question amounts to pointless pumping. In these situations the teacher should provide some kind of help, either by making the question easier or by providing a clue, and not simply repeating the original question without giving any help.

Cluster I contains only one variable, but a very important one: the relative frequency of public response opportunities. Of the variables in the Table, this

one corresponds most closely to the "student talk" variable stressed by Flanders and others. Note that the pattern of correlation supports the contentions of Flanders and others that student talk is important, but only for the non-Title I schools. The one significant correlation involving this variable for Title I schools was negative. The data for this variable are one instance of a larger pattern of findings suggesting that generally indirect teaching, frequent student talk, and frequent pupil-to-pupil interaction are facilitative in non-Title I schools, but not in Title I schools (more will be presented below). The children in Title I schools appear to profit more from more highly structured and teacher-dominated instruction. These students, in the early grades at least, apparently require more direct instruction, explanation, and demonstration from the teacher and are less likely to profit from discussion and independent activities than children in in non-Title I schools.

Cluster J deals with student-initiated questions. The frequent absence of correlations in this cluster indicate that student-initiated questions were relatively infrequent. This should be kept in mind in evaluating the following results. First, these questions were coded as either relevant or irrelevant to the topic under discussion at the time, with the expectation that relevant student questions would correlate positively with student learning gains. Unexpectedly, the only significant correlations on the relevant versus irrelevant aspect of student-initiated questions showed that higher frequencies of irrelevant questions were associated with learning gains. However, note that this relationship exists largely in the Title I schools in reading groups. This fits in with several previous findings suggesting that any teacher behavior which involves acceptance or encouragement of voluntary contribution to discussion in Title I schools (especially in reading groups) will be positively correlated with learning gains. This same point is relevant to the following measure concerning the percentage of student-initiated questions which were called out. Here there was only one significant

relationship, but it was unexpectedly positive, and it was for the Title I schools only.

The data for praise and criticism of student-initiated questions showed a mixed pattern, just as the previous praise and criticism data did. Praise of relevant student-initiated questions correlated positively, as expected, but so did criticism. These data are for the non-Title I schools only, because praise and criticism of relevant student-initiated questions did not occur often enough in Title I schools to allow computation of correlations. Perhaps the praise was for questions that she saw as having already been answered or as indicating carelessness or inattention; we cannot tell from the data. The praise and criticism directed towards student call out behavior (as opposed to praise and criticism of the questions themselves) were also surprising. As expected, criticisms and warnings directed at the students for calling out questions without prior authorization were positively associated with student learning gains, but only for relevant questions. Criticism for calling out irrelevant questions did not occur frequently enough to allow computation of correlations, and warnings for calling out irrelevant questions were <u>negatively</u> correlated with student learning gains. Furthermore, the latter data are for non-Title I schools, so thay do not fit in with our earlier statements about the importance of encouraging any kind of contribution to the discussion in Title I schools. The latter correlations are based on a very small number of teachers, however, so they may well be spurious. We prefer to wait and see if they replicate in next year's data before attempting to interpret them.

The data on teacher response to <u>relevant</u> student-initiated questions suggest that in non-Title I schools the teacher who legitimized the question and then either delayed feedback until a more appropriate time or gave brief feedback on the spot were more effective than teachers who either refused to accept the ques-

tion or who responded with long feedback (probably breaking up the pace of the lesson). Redirecting the question to the class was uncorrelated with teacher effectiveness, somewhat in contradiction with the advice of proponents of frequent student talk and integration of student questions into the discussion. Correlations involving these variables in the Title I schools were generally similar, except that there were some negative correlations for delaying responding to the question, suggesting that students in Title I schools need more immediate feedback than students in non-Title I schools. Also, redirection of the question to the class was negatively correlated with learning gains in the Title I schools. This is another indication of the point made above that the Title I students seem to need more teacher-dominated instruction and less pupil-to-pupil interaction than the students in non-Title I schools.

The data regarding teacher feedback to irrelevant student -initiated questions are extremely mixed and based upon a small number of teachers, so that no attempt to interpret them will be made.

Cluster K also contains a single variable: the percentage of public response opportunities which are initiated by students rather than teachers. Contrary to expectations, the only significant correlations involving this variable were in the non-Title I schools, and these were <u>negative</u>. If taken at face value, these data would seem to go against the general finding that indirect teaching and student talk appear to be facilitative in non-Title I schools. However, it is possible that this is a "proxy" variable for classroom control. Perhaps the teachers in non-Title I schools who have very high rates of student-initiated comments and questions are teachers who have poor classroom control and are generally disorganized. This is a very likely possibility, since data from other aspects of the study (both in this paper and in Evertson and Brophy, 1973) suggest that classroom control, especially the management skills described by Kounin (1970), are among

the most important correlates of student learning gains in both Title I and non-Title I schools.

Cluster L deals with student-initiated comments. These were considerably more frequent than student-initiated questions, although still relatively infrequent. As was the case with student-initiated questions, the percentage of relevant student-initiated comments was negatively associated with student learning gains in the non-Title I schools (although only one correlation reached statistical significance). However, in the Title I schools the relationship was reversed, with the percentage of relevant student-initiated comments correlating positively with student learning gains.

The percentage of student-initiated comments which were called out without prior recognition of the student was positively correlated with learning gains in non-Title I schools but negatively correlated in Title I schools. The latter correlations constitute an exception to our generalization that teacher behavior which encourages student participation of any kind is important in Title I schools. Perhaps the called out comments in Title I schools were undesirable (disparaging remarks about a classmate's response to a question, for example), or perhaps high frequencies of called out comments in Title I schools were associated with poor classroom control. Either or both of these factors could have been operating to produce the negative correlations.

Again, the praise and criticism data show a mixed and confused pattern. Praise following a relevant student comment was negatively associated with student gains in non-Title I schools in one instance and positively associated with students gains in Title I schools in one instance. All other relationships were nonsignificant. Criticisms and warnings for calling out comments were unrelated to student learning gains in Title I schools, and showed a mixed pattern of correlations in the non-Title I schools. Praise following an irrelevant student comment

actually correlated positively with student learning gains in one instance in the Title I schools, again underscoring the importance of encouraging participation and discussions in these schools. Criticism of students for calling out irrelevant comments was unrelated to learning gains in Title I schools but negatively related in non-Title I schools. The latter findings suggest that the more effective teachers in non-Title I schools confine their response to a simple warning rather than a more severe criticism when reminding the students not to call out comments without permission.

The data regarding teacher feedback to student-initiated comments hold together rather consistently, although they disagree with the comments of Flanders and others concerning acceptance of student ideas. First, failure to give feedback to relevant student comments was not negatively correlated with learning gains; in fact, although no relationships were significant, most were positive. Furthermore, the various categories of teacher response to relevant student-initiated comments showed very few significant relationships to student learning gains in non-Title I schools. Delaying a response correlated positively twice; not accepting a comment (declaring it irrelevant or out of order) correlated negatively once; accepting the comment correlated negatively twice; integrating the comment into the discussion never correlated significantly; and shifting the discussion to the topic raised by the student's comment correlated negatively once. This mixed pattern of findings suggests that giving students feedback (not necessarily immediately) is important, but not use of student ideas to the extent of adapting the discussion to accommodate them (again, though, bear in mind that these data are from the early grades).

In Title I schools there were fewer significant correlations, partly because there were fewer student-initiated comments. Delaying feedback correlated positively once, not accepting the student's comment correlated positively three times, and accepting the student's comment correlated positively twice and negatively

once. Integrating the student's comment into the discussion correlated negatively three times, and shifting the topic to accommodate the student's comment correlated negatively once and positively once. Thus the pattern in Title I schools again shows the importance of responding to the student but actually shows a generally negative relationship between using the student's idea to the extent of integrating it into the discussion or shifting topics in order to accommodate it. The general pattern of findings regarding teacher response to relevant student comments suggests that delayed and brief feedback to the student rather than an attempt to use his comment as the basis for discussion seems to be the most effective response.

The data for irrelevant student-initiated comments shows a similar but more extreme pattern than the data for relevant student comments. In non-Title I schools, failure to give feedback correlated negatively twice, delaying feedback did not correlated significantly, not accepting the student's comment correlated positively three times and negatively twice, accepting or agreeing with the student's comment never correlated signficantly, integrating the comment into the discussion correlated negatively four times, and shifting the topic to accommodate the comment never correlated significantly. Here again, there is no support for the importance of accepting student ideas or accommodating them into the discussion. There is, however, support for the idea that the teacher should give feedback to the student's comment. In the Title I schools, failure to give feedback and delay in giving feedback did not correlate significantly, responding to but not accepting the student's comment correlated positively three times, accepting the student's comment did not correlate signficantly, integrating student comments into the discussion correlated negatively four times, and shifting topics to accommodate the comment did not correlate significantly. Here again, the major positive cor-

relate was non-acceptance of the student's comment; teacher behavior involving acceptance of the comment or attempts to integrate into the discussion were either uncorrelated or negatively correlated with student learning gains.

The data in Cluster N regard self-and opinion questions. Self-questions did not deal directly with the curriculum, although they sometimes were used as lead-ins to a topic ("Do you like bananas?...Today we're going to learn about where bananas come from.") Other self-questions simply dealt with student likes and dislikes or other non-academic matters such as personal experiences, "show and tell," etc. Only a few correlations involving self-questions were significant, and these showed a negative relationship between the frequency of self-questions and student learning gains. This is simply the obverse of the finding reported above (Cluster I) showing a positive relationship between student opportunities to answer curriculum-related questions and learning gains. To the extent that the teacher is involved in activities which involve only self-questions, she is not teaching the curriculum.

Opinion questions are related to the curriculum but they gauge the student's opinion on a question, and do not have any simple right or wrong answer. They are usually used in discussion periods, although they sometimes also are used as a way to lead into a lesson. Correlations regarding the frequency of opinion questions as opposed to process, product, and choice questions are mostly but not completely negative. Most coefficients are negative, including 5 of the 6 which were significant. Thus in general the frequency of opinion questions was negatively correlated with student learning gains. In part this is for the same reason mentioned above; when the teachers are asking opinion questions, they are not teaching the curriculum as such. Also, at this age level the opinion questions frequently are trivial, not the kind of thought-provoking opinion questions that are often asked at the higher grades.

Data regarding teacher feedback to opinions expressed by students following these questions parallel the data given previously. Failure to give feedback was infrequent, but when it did correlate it correlated negatively, significantly three times. Praise correlated negatively whenever the correlation reached significance. Teacher disagreement with student opinion showed a mixed pattern, but the one significant correlation was positive. Acceptance of student opinions showed one positive and one negative significant correlation, and integration of student opinions into the discussion topic showed one positive and three negative significant correlations. Here again, the data show the importance of giving feedback responses to students but do not support the importance of use of student ideas or integrating them into the discussion.

Cluster N deals with private work and procedural contacts initiated by either the student or the teacher. Correlations for the frequency of private student-initiated contacts were positive if the contacts involved work, but negative if they involved classroom procedures or personal concerns. Thus teachers who create an atmosphere in which the students feel free to come to them for help or discussion of their seatwork are more successful than other teachers in obtaining student learning gains. In contrast, teachers who have frequent rates of student-initiated contacts for procedural purposes (presumably because the teacher has not developed organizational mechanisms to see that these procedures are handled "automatically" so that the students don't have to keep coming up to her to ask her questions about them) are less successful in obtaining student learning gains.

The data on teacher praise and criticism in these private contacts mirror the data on these variables in public contacts. For student-initiated contacts involving work, both praise and criticism were negatively correlated with student learning gains. The data on praise in teacher-initiated work contacts were simi-

lar, except that one of the 6 significant correlations was positive. Here again, teacher praise and criticism came through as relatively unimportant variables, and both tended to correlate negatively with student learning gains when they did correlate significantly. Again, there was little support for the importance of praising students, although criticising students did come through as a negative teacher behavior.

The data for teacher feedback in student-initiated work contacts show positive correlations for brief teacher feedback and mixed correlations for delaying feedback or giving long feedback. Finer analysis shows that delaying feedback tended to be negatively correlated in Title I schools, while giving long feedback was positively correlated in these schools. Thus these students appear to need more immediate feedback than students in non-Title I schools, and they sometimes need extended explanations rather than brief feedback. In contrast, the students in non-Title I schools could tolerate delayed feedback without problems for the most part, and in general did better when given brief feedback rather than long (over-dwelling?) feedback.

The data for feedback in teacher-initiated work contacts are different: all correlations are negative, whether for mere observation, for giving brief feedback, or for giving long feedback. These correlations appear to be less related to the feedback categories than to the larger category of teacher-initiated feedback, which itself seems to be negatively related to teacher success in producing student learning gains. That is, the more successful teachers operated by having students come to them when they needed help, and did not spend great amounts of time having students work silently while they went around the room checking work at the student's desks. The latter method appeared to be especially non-productive in the non-Title I schools, as might have been expected. Teachers who use this method in effect enforce long periods of silence, passivity, and often inactivity

upon their students. This regimentation appears to be harmful as well as unnecessary, especially in non-Title I schools.

The percentage of student-initiated contacts which involved personal concerns (as opposed to work) was negatively correlated with student learning gains, as expected. However, the measures of teacher response to these personal concerns showed differential relationships with student learning gains. Teachers who granted a large percentage of these student-initiated requests were generally more successful than teachers who tended to either delay or to refuse to grant them. These measures in combination probably also reflect the more major teacher variable of openness and flexibility regarding student needs versus unnecessary regimentation and inflexible structure.

The measure of private work contacts over itself plus public response opportunities was negatively correlated with learning gains. This fits in with earlier data showing that the more successful teachers had more discussion or at least question and answer sessions in their classrooms and fewer periods in which students were involved in silent seatwork or other activities which did not involve response opportunities. The measure of procedural contacts over itself plus response opportunities shows an even stronger set of negative relationships for the same reason.

The measure of teacher-initiated work contacts over itself plus teacher-initiated procedure contacts somewhat surprisingly also shows negative relationships with learning gains. This reinforces the statement made earlier that apparently teacher-initiated work contacts are themselves negative in some direct way, and that teachers should train their students to come to them when they need help rather than structure the classroom so that much time is spent inspecting student work. (Note: An alternative or additional explanation of these findings is

that the teachers who initiated a large number of work related contacts during schools hours are correcting papers in school and taking up school time to do this, while teachers who have low rates of initiated work-related contacts may be teachers who reserve as much school time as possible for other matters and who correct papers in their time out of the classroom. This seems reasonable but it is not directly testable from the available data. It will be investigated in next year's replication study, however.).

The measure of the percentage of teacher-initiated procedural contacts which involved management requests (as opposed to errands or special favors) was strongly negatively correlated with student learning gains. Here again, the data suggest that the more successful teachers have set up routines which take care of daily management needs "automatically" so that they do not have to continually request that these duties be carried out "on the spot."

The measures of teacher frequency of thanking students following favors or management requests showed mixed results, with positive correlations in Title I schools and negative correlations in non-Title I schools. Along with the praise data, these findings reinforce the more general finding that verbalization of teacher affect appears to be relatively unimportant, especially at non-Title I schools. It was expected that these two measures would be good indicators of general teacher warmth and rapport with students, and that they would show strong and consistent correlations with student learning gains, but they did not. We will be investigating them further to see if this is because the variables are truly unimportant or whether relationships might have been depressed by low variance or masked by curvilinearity or some other factor.

Cluster O deals with teacher praise, warning, and criticism summed across all of the various contacts that they had with their students. The measure of

academic praise (praise of good answers or good work) over itself plus academic criticism shows mixed correlations with student gains. There were two negative and three positive relationships in Title I schools, and two positive and no negative relationships in non-Title I schools. The relationships for this particular variable seem to be more determined by the criticism factor than by the praise factor. Again, teacher praise was neither as clear-cut nor as important as was expected as a correlate of success in producing learning gains.

The data on behavioral praise and warnings show negative correlations for behavioral praise but positive correlations (with one exception) for behavioral warnings as opposed to behavioral criticisms. Taken together, the data on praise and criticism, both for academic work and for classroom conduct, suggest the following: 1. contradicting the conventional advice and the advice of behavior modifiers in particular, praise does not appear to be a very important or effective teacher behavior; 2. however, criticism is a rather clearly negative teacher behavior, with teachers who criticize heavily being the least successful; 3. in general, the successful teachers are those who have good management techniques which minimize classroom problems and who are well-organized so that they maximize student learning opportunities and especially opportunities to verbally participate in classroom activities. The data regarding classroom management strongly support the suggestions of Kounin (1970), particularly the point that the teacher's activities in organizing the classroom so that disruptions are minimized are far more important than her responses to disruptions which do occur. The data regarding opportunity to learn confirm several previous studies showing this to be an important variable (Rosenshine and Furst, 1971).

Cluster P deals with discipline and control errors made by the teacher. These categories were adapted from those used by Kounin (1970). Again, the data

generally bear out Kounin and provide little support for behavior modification techniques. The percentage of discipline contacts involving one or more errors was generally negatively correlated with learning gains, although there was an exception in Title I schools. The measure of target errors was uncorrelated with learning gains (target errors were infrequent). Timing errors were negatively correlated with learning gains (essentially in Title I schools), and teacher over-reactions were mixed. These data suggest, as does Kounin, that it is better for the teacher to err on the side of nipping a potentially disruptive situation in the bud than to err by allowing it to go on too long and to begin to spread to other students. Thus it appears to be better to move in too quickly or to overreact than to underreact. The measure of non-verbal control contacts over total control contacts which was expected to show positive relationships actually showed negative relationships with learning gains. This variable refers to stopping disruption or forbidden activity through non-verbal means such as gestures or quietly touching the offending student, as opposed to more disruptive methods such as calling out the student's name or stopping the activity in order to deal with the situation. Advice on classroom control usually suggests that this is the most preferable method of intervention if intervention is necessary, since it is the least disruptive. However, correlations with learning gains were negative, reinforcing the point made above that the data suggest that it is better for the teacher to act quickly and decisively than to delay or underreact to a control problem.

Cluster Q, the final cluster, shows teacher feedback data combined across various types of contacts with students. These data show more clearly that simply repeating a question when the student has not been able to respond the first time (pointless pumping) is ineffective, while rephrasing the question and giving a clue are effective. Also, brief feedback is generally more effective than

long feedback, although there is one exception in Title I schools. In general, the non-Title I students seemed to require less extended and less immediate feedback than the students in Title I schools, and correlations for the various teacher feedback categories usually were in opposite directions for these two types of schools. The most likely reason for this is that students in non-Title I schools are probably able to work independently more successfully than students in Title I schools, and probably are less in need of feedback or guidance from the teacher. Thus brief feedback is sufficient to meet their needs and enable them to return to independent work. Students in Title I schools, however, often require more extended teacher feedback before they can profitably return to independent work.

Small group instruction variables. (See Appendix B)

Data from the coding system for small group instruction variables are presented in Table 3, which includes both correlations between process measures and student gain measures as well as correlation coefficients reflecting observer agreement. Relatively few of the relationships of these process variables to student learning gain measures reached statistical significance, but it should be borne in mind that data were available on 10 teachers (8 in the case of the Arithmetic Reasoning scores), and that teachers were observed only twice, so that the process measures were very likely weakened by error variance due to low reliability.

The teachers selected for observation with this instrument were five of the most effective and five of the least effective in the sample. This selection was made because limitations on time and personnel required limitations on the number of teachers who could be observed with this system. Observers did not know the effectiveness of the teachers, of course.

Correlations are presented only for the whole group because only three of

the 10 teachers included were teaching in Title I schools. In effect these data for the whole group represent the relationship in the non-Title I schools primarily.

Data on the lecture versus discussion mode of presentation suggest that this dimension is unimportant to student learning gains or else is related to them in some more complex way than sheer frequency or degree of emphasis. There were significant relationships relating teacher behavior in small group lessons to student learning gains, but they did not include the amount of time spent lecturing or discussing. One variable that was important was the relative amount of time that the teacher spent lecturing or introducing a topic versus allowing the students to practice the newly introduced content. Teachers who spent great amounts of time reviewing and/or introducing new topics were less successful than teachers who spent less time doing that and saved more time to allow the students to practice application of the new concept or skill themselves. These findings support the frequently made suggestion that young children need to learn by doing.

Variables relating to whether the teacher worked with individuals, subgroups, or the entire group were strongly related to learning gains and highly consistent. The most successful teachers worked primarily with individuals and least with the entire group. In combination with the above findings, the data suggest that the most successful teachers introduced a new topic, then allowed students to work with it and gave individualized feedback as they observed their work.

When the teacher was introducing a topic, she was more successful if she used a demonstration or diagram than if she confined herself to lecturing. This fits with typical teaching advice based on the idea that young children respond better to concrete than abstract learning presentations.

Several measures of activities during the groups again suggest the importance of active grappling with the material on the part of the students. Silent reading was positively associated with learning gains, while dead spots due to interruptions were negatively associated. The one significant correlation involving drill activities intended to promote overlearning was negative, but this finding is tenuous because such activities were observed only rarely and in only a few groups.

The data on patterned versus non-patterned turns flatly negated our expectations and the usual advice given to teachers to avoid patterned turns. Teachers who follow this advice by using non-patterned turns were less successful than those who used patterned turns. This is another place where we wonder whether the relationship is actually between the patterned turn versus non-patterned turn variable and student learning gains or whether the patterned turn variable might actually be a "proxy" variable. That is, perhaps the teachers who used patterned turns tend to be teachers who also establish good classroom management routines and are generally better organized than the teachers who do not. This possibility will be investigated.

Other significant correlations included a positive relationship between using traditional materials (those that come with the books) for seatwork and homework assignments, positive relationships for the use of games and special activities to promote interest and variety, and the use of differentiated individualized materials for different children. These findings all reflect the most common advice in teacher training materials.

The percentage of wasted lesson time correlated negatively and the percentage of time in which the teacher was doing two or more things correlated positively, supporting the observations of Kounin (1970).

Somewhat surprisingly, the measure of the teacher working alone removed from the class correlated positively (once significantly) with student learning gains. We had expected a negative relationship, reasoning that such behavior would reflect avoidance of, or poor rapport with, students. However, coder judgments of rapport with students did not correlate significantly with student learning gains (Evertson and Brophy, 1973). In any case, no interpretation will be offered for the finding concerning teachers working alone at the desk until we have had a chance to investigate its meaning further.

Variables toward the end of the table mostly reflect in a somewhat different way the realtionships already mentioned (importance of working with individuals rather than groups, importance of providing variety of materials, importance of allowing maximum time for students to practice with newly learned skills or materials, the negative effect of wasted time). Thus only two more variables from Table 3 will be discussed.

Variable 52, the percentage of student self-evaluation which is teacher-elicited, showed positive correlations with student learning gains. In essence, this means that teachers who frequently asked questions relevant to the material introduced were more successful than teachers who questioned infrequently. This fits with the earlier reported findings about the importance of public response opportunities. Thus although discussion is not important for student learning, teacher questioning is.

Variable 61, a high proportion of standardized (vs. teacher-created) materials, correlated positively with student learning gains (once significantly). This was mildly surprising, and we are not sure yet what it means. If taken at face value, it means that the materials provided in a published curriculum are likely to be better than those made by the teacher, on the average. However, this relationship might also mean that teachers who use a relatively high percentage of teacher-made materials are using lesson time unproductively, such as by playing games

or conducting drill activities of questionable value to the students. In any case, this variable needs to be investigated further before its meaning can be interpreted with confidence.

DISCUSSION

The above list of behaviors correlating positively with teacher success in producing student learning gains contains many that are frequently advocated in teacher training materials. However, it also contains a few relationships which contradict the typical advice given to teachers. This is especially true for the data from Title I schools. The importance of school SES appeared in a two-way analysis of variance (Title I vs. non-Title I classrooms and grade 2 vs. grade 3 classrooms as the classifying variables) carried out on all of the measures available at the time. These analyses showed that although grade was relatively unimportant (the main effect was significant for only 4% of the variables), the main effect for Title I vs. non-Title I classrooms was significant for 25% of the measures. Furthermore, a grade X Title I interaction appeared on 10% of the measures, and most of these appeared to be caused primarily by Title I rather than grade differences.

These analyses suggest that what is optimal teaching in Title I schools is not quite the same as what is optimal teaching in non-Title I schools, and point up the need for separate analyses of process-product data taken in schools of contrasting SES. In general, the results for non-Title I (high SES) schools bear out the typical teacher training text's advice, but those for Title I schools often do not.

Second year replication

Considering the carefully selected sample of teachers on which they were

based, and the broad variety of both high and low inference measures included in the analyses, the data described above (along with those reported in Evertson and Brophy, 1973) represent a qualitative improvement in several respects over previous teacher effectiveness research. The obvious next step in the research and development process is to move from the naturalistic model which identifies behavioral correlates of effective teaching into experimental models designed to establish the cause and effect relationships among the variables involved. However, this step has been deferred for a year in order to get a second year of naturalistic data.

This repetition of the naturalistic data collection cycle was deemed necessary for several important reasons. First, the process measures were based on a sample of only four observations per teacher (and in the case of the group presentation methods observations, on a sample of only two observations per teacher), and these observation frequencies are dangerously small. Given the probability that teacher behavior varies from one observation to the next, because of the situational factors operating (whether the teacher happens to be introducing a new unit or reviewing one before finishing it, for example), the impression gained by observing a teacher only four times might be somewhat inaccurate, even if she is basically consistent in her classroom behavior. Consequently the behavioral coding and high-inference ratings will be used again during a second year of naturalistic observation.

The second year of naturalistic data collection will include ten to fifteen half day observations per teacher instead of only four. This will be accomplished partly by starting earlier, and partly by using only a single observer in the classroom rather than pairs, once reliability is established. Each teacher will still be seen by at least two observers (separately) even in the second year data collection, however, so that interobserver agreement on the high-inference ratings

can be checked once again.

Another reason for repeating the naturalistic phase before going on to experimental paragigms is that the first year's data set is completely unique and in many respects not comparable to any other data. Also, since only 31 teachers were studied and the research involved well over 1000 variables on each teacher, the study obviously violates several assumptions underlying the use of significance tests, so that the significance tests used do not provide the logical basis for drawing the inferences that they would provide when the assumptions underlying them are met.

The replication study, of course, will also violate the same assumptions, since it will also involve a relatively small number of subjects and a large number of variables; however, it will provide a second set of data that can be compared directly with the first, and ultimately, replication of a set of findings across several studies rather than the level of significance of a finding in a single study is the basis for acceptance of empirical data. Those findings that replicate across both years of naturalistic data collection are likely to be quite solid and to replicate in future studies also, despite the problems in applying inferential statistics to either data set.

Most of the teachers studied in the first year will be studied again in the second year (a few have retired, gone on maternity leave, or been transferred to other grades), so that data bearing on the question of stability of teaching style across two years will be generated. In addition, new teachers will be added to the study according to the same criteria used for selecting those in the original sample, so that the replication will include some teachers who were not studied the previous year. Inclusion of these new teachers will help us determine whether the process-product relationships shown in the first year data are generalizable and not restricted to the particular sample of teachers studied

the first year.

In addition to using the same high and low inference measures of classroom process used the first year, the replication study will add some new measures to help round out the picture of effective teaching that we are gathering. Some of the new data will come from additional high-inference ratings of variables not rated in the first year. Most of the new data, however, will come in a teacher interview to be administered at the end of the second year. This interview will cover a broad range of content, probing the teachers on their philosophies, approaches to teaching, time utilization in and out of class, planning and organization, curriculum and methods preferences, and many other matters. Particular attention will be given to those aspects of teaching that cannot be picked up through only periodic observation, especially events that unfold over time, such as the planning and teaching of entire units and the teachers' methods of dealing with particular kinds of children (the bright child who finishes his work early and needs some extra assignments, the slow child who needs extra time from the teacher, the child who misses a week or two because of illness and has to catch up, etc.).

Other Analyses

In addition to replication, the present data require further analyses designed to reveal their full meaning. First, the present data are restricted to Pearson r's, which reflect only linear process-product relationships. There is reason to believe that several relationships will be curvilinear or otherwise non-linear. This will be investigated in a series of multilinear regression analyses of the process-product relationships.

The variance in each process variable also needs to be analyzed, especially for variables which "should have" correlated significantly. It may be that lack

of correlation was because of limited variance in certain process measures, rather than to a genuine absence of a process-product relationship.

Intercorrelations and possibly factor analyses of the measures are also needed, to help reveal their interrelationships. Even though there were many more variables than subjects, such analyses will be useful, especially for revealing the precise meaning of certain relationships (such as separating those which appear to be genuine process-product correlations from those in which the process measure appears to be a "proxy variable," so that the actual relationship is somewhat different from that suggested by the correlation taken at face value).

Caveats

The data are mostly internally consistent regarding process-product relationships, although a few apparent contradictions appeared. Also, the findings reported in this paper are regularly supported by the high-inference variables in the Evertson and Brophy (1973) paper. The only clear exception is the variable of staying-at-desk vs. going-around-the-room while correcting seatwork. The present data suggest that staying at the desk and having children come to the teacher is preferable, but some high-inference data suggest the opposite. Thus, in general the process-product data hang together rather well, even though they often contradict the conventional wisdom about effective teaching (including many of our own expectations!). Nevertheless, all of the following factors, each of which represents a potentially important source of error, should be borne in mind in interpreting the results:

1. Only two-four observations per teacher were obtained on a sample of only 31 teachers (really two subsamples of 18 and 13, since Title I and non-Title I schools appear to require separate analyses).

   a. Thus the low-inference process measures undoubtedly contain much error variance due to situation variability. This problem will be addressed in

the replication study by increasing the number of observations to 10 to 15.

b. The high-inference ratings, checklists, and percent estimates (Evertson and Brophy, 1973) show signs of widespread halo effects and/or logical errors, despite coder training. This also probably stems from the limited contact each coder had with each teacher, and will be reduced in the replication study.

2. Most of the statistically significant r's are low, the significance level was set at .10 instead of .05, and assumptions underlying the use of significance tests could not be met. Thus many r's are probably spurious and will not replicate.

3. Without replication, and in the absence of comparable data, it is difficult to predict which r's are meaningful at face value, which are genuine but cannot be taken at face value because they involve "proxy variables," and which are spurious and will not replicate.

4. The product criteria probably were inappropriate to some unknown degree for each teacher, to the extent that her curriculum objectives differed from or were not tested by the MAT. Thus it is possible that some teachers with low product gain scores were actually achieving good product gains, but in areas not measured by the MAT. (This is not likely to be a very serious factor, however. Gains in various areas correlate strongly in the early grades and teaching stresses the three R's, so that MAT gains are probably good estimates of teacher effectiveness. Also, the pattern of findings, especially the poor management skills and low opportunity to learn observed in classes of teachers with low gain scores suggest that the criterion scores are accurate).

5. Only process-product data have been presented; so far we have not investigated the full meaning of the product (learning gains) criterion. Other data

(Peck and Veldman, 1973) suggest that achievement gains might be achieved at a cost in affect or other areas, judging by the personal characteristics and attitudes of the teachers. This question will be addressed in the correlational analyses relating process variables to one another as well as to product criteria. In addition we will be administering a measure of student attitudes toward the teacher. In particular, we will attempt to see if the teachers who get consistently high learning gains are "slave drivers," "charismatic teachers," "motivators," or what. At present, we don't know.

Implications for teacher evaluation

The project is not far enough along yet to allow us to draw many clear-cut implications for teacher evaluation, but a few statements can be made with confidence at present. First, although the Brophy (1972) teacher stability data were encouragingly higher than those previously reported, and although they allowed identification of consistent teachers to be included in the observational studies described, the stability coefficients for the sample as a whole were not high enough to justify the use of standardized achievement tests for evaluating teachers. Thus, in an unselected sample there is simply too much variability from one year to the next in teachers' production of student learning gains on these tests.

Second, the Brophy (1972) data show that a yearly "class" or "cohort" effect is noticeable even when residual gain scores which are supposed to eliminate such effects are used. Residual gain scores from different subtests in the same year intercorrelate more highly than scores from the same subtest correlate from one year to the next. Such yearly variability might be due to rather obvious causes such as teacher and student health or personal problems or changes in curricula, but they may also be due to factors which are more difficult to identify, such as year-to-year differences in class leadership, class morale and motivation, or the general tenor of teacher-student relationships.

Third, for the reasons mentioned above, the findings of the study remain too tentative at this point to provide a solid basis for evaluating teachers through process observations. However, after two years of data have been collected and all of the planned statistical analyses have been completed, we should be able to identify teacher behavior that is related to the production of student learning gains with much greater confidence. The results will remain correlational, although those that replicate over two years and show up consistently on several different types of measures are very likely to be causes and not merely correlates of student gain. This will be investigated, however. Following the second year of naturalistic study, we will move into a series of experimental and quasi-experimental studies in which teacher behavior that appears to be related to student learning will be systematically varied to see if predicted effects on students are observed. In these studies the teachers will be the experimenters and we will be the data collectors, using observation instruments to link teacher and student behavior and demonstrate causal mechanisms where they exist. These data, and those produced by other investigators in similar studies, should eventuate in the development of observation scales that can be used to evaluate teacher behavior (for examples, see Good and Brophy, 1973).

Before such process evaluation can be done with confidence, however, and certainly before it should be used for teacher accountability purposes, two advances beyond the present state of the art must be made: (1) We must identify teacher process variables which show stable and reasonably high correlations with criteria (whatever criteria are used); (2) Teachers should show high stability on the process variables themselves, in the absence of intervention or treatment designed to change their behavior on these variables. Where these conditions were met, teacher evaluation through process observation would be quite valid and defensible. Even here, however, process observation instruments should not be used for evaluation purposes

only. Training modules designed to optimize teacher behavior on each variable should be developed and used with the teachers, and where accountability is involved, teachers should be rewarded for making gains on these variables of maintaining a high level of performance. It would be tragic and wasteful if process evaluation data that had such obvious implications for inservice teacher training were used solely for accountability evaluations.

References

Brophy, J. Stability in Teacher Effectiveness. Report Series No. 77, Research and Development Center for Teacher Education, The University of Texas at Austin, 1972.

Brophy, J. and Good, T. The Brophy-Good Dyadic Interaction System. In A. Simon and E. Boyer (Eds.). Mirrors for Behavior: An Anthology of Observation Instruments Continued, 1970 Supplement, Volume A. Philadelphia: Research for Better Schools, Inc., 1970.

Coleman, J., et al. Equality of educational opportunity. Washington: U.S. Government Printing Office, 1966.

Dunkin, M. and Biddle, B. Book on Teacher Effectiveness. In press, 1973.

Evertson, C. and Brophy, J. High inference behavioral ratings as correlates of teaching effectiveness. Paper presented to the annual meeting of the American Educational Research Association, 1973.

Flanders, N. and Simon A. Teacher Effectiveness. In R. Ebel (Ed.). Encyclopedia of Educational Research, 4th edition. New York: Macmillan, 1969.

Good, T. and Brophy, J. Looking in Classrooms. New York: Harper and Row, 1973.

Hess, R. Class and Ethnic Influences upon Socialization. In P. Mussen (Ed.). Carmichael's Manual of Child Psychology, Volume 2. New York: John Wiley and Sons, 1970.

Jencks, C., et al. Inequality: A Reassessment of the Effect of Family and Schooling in America. New York: Basic Books, 1972.

Kounin, J. Discipline and Group Management in Classrooms. New York: Holt, Rinehart and Winston, 1970.

Mitzel, H. and Gross, C. The development of pupil growth criteria in studies of teacher effectiveness. Educational Research Bulletin, 1958, 37, 178-87; 205-275.

Mood, A. Do teachers make a difference? In A. Mood (Ed.). Do Teachers Make a Difference? Washington: U.S. Government Printing Office, 1970.

Morsh, J. and Wilder, B. Identifying the Effective Instructor: A Review of the Quantitative Studies, 1900-1952. USAF Personnel Training Research Center Bulletin No. AFPTRC - TR - 54 - 44, Lackland Air Force Base, San Antonio, Texas, 1954.

Peck, R. and Veldman, D. Personal characteristics associated with effective teaching. Paper presented to the annual meeting of the American Educational Research Association, 1973.

Rosenshine, B. Teaching Behaviours and Student Achievement. London: National Foundation for Educational Research in England and Wales, 1971.

Rosenshine, B. and Furst, N. The use of direct observation to study teaching. In R. Travers (Ed.). Second Handbook of Research on Teaching. New York: Rand McNally, 1973.

Veldman, D. and Brophy, J. Measuring teacher effects on pupil achievement. Paper presented at the annual meeting of the American Educational Research Association, 1973.

Table 1. Intercoder Agreement on the Expanded Brophy-Good Observation System[1]

A. Agreement Percentages

Behavior Category Requiring Coding Decision (presence-absence and/or choice of which alternative applies)	% Agreement	
	Median	Range
Public Response Opportunities		
Type (names respondent before question vs. calls on non-volunteer vs. calls on volunteer vs. student calls out answer)	63	37-78
Level (process vs. product vs. choice)	73	46-93
Answer (correct vs. part-correct vs. incorrect vs. "don't know" vs. no response)	70	52-86
Feedback (praise vs. criticism vs. no feedback vs. process feedback vs. product feedback vs. calls on another child vs. student calls out answer vs. repeats question vs. gives clue vs. asks new question)	58	17-69
Student-Initiated Questions		
Relevancy (relevant vs. irrelevant)	52	29-71
Feedback (praise vs. criticism vs. no feedback vs. delays feedback vs. does not accept question vs. brief feedback vs. long feedback vs. redirects question to class)	43	29-73
Student-Initiated Comments		
Relevancy (relevant vs. irrelevant)	53	38-83
Feedback (praise vs. criticism vs. no feedback vs. delays feedback vs. disagrees with comment vs. agrees with comment vs. integrates comment into discussion vs. shifts topic to topic of student's comment)	43	25-78

B. Correlation Coefficients	Median	Range
Student-Initiated Questions		
Type (sanctioned vs. called out)	.81	.04-.90
Student-Initiated Comments		
Type (sanctioned vs. called out)	.94	.87-.99
Child-Initiated Work Contacts		
Feedback		
Praise	.80	.41-.95
Criticism	.86	.09-.99
Delays Feedback	.64	.12-.89
Brief Feedback	.97	.88-1.00
Long Feedback	.90	.81-.99
Teacher-Initiated Work Contacts		
Feedback		
Praise	.90	.79-.99
Criticism	.66	.22-.95
Merely Observes	.96	.59-1.00
Gives Brief Feedback	.94	.18-.94
Gives Long Feedback	.95	.75-.99
Child-Initiated Procedure Contacts		
Type		
Personal	.84	.33-.99
Managerial	.83	.28-.98
Response		
Grants request	.58	.22-.95
Delays request	.50	.11-.87

	Median	Range
Does not grant request	.83	.12-1.00
Teacher-Initiated Procedure Contacts		
Type		
Favor request	.86	.55-1.00
Management request	.91	.33-.98
Response (thanks child vs. does not thank child)	.89	.19-1.00
Behavior-Discipline Contacts		
Teacher Behavior		
Praise of good behavior	.94	.53-.98
Non-verbal warning re misbehavior	.64	.05-1.00
Verbal warning re misbehavior	.89	.68-.99
Criticism of misbehavior	.78	-.16-.99
Errors in Handling Control Problems		
No Error	.72	.15-.93
Target error	.89	-.08-1.00
Timing error	.56	.34-.93
Overreaction	.80	.23-.99

[1] Coders worked in pairs. Where coding sequences could be matched and compared (Section A), exact agreement percentages are given. The remaining variables (Section B) were simply tallied, so that agreement percentages could not be computed and Pearson r's between the totals for each classroom visit were computed instead. Figures are for pairs of coders; thus the range data show the differences between the least and most reliable pair of coders for each item.

Table 2. Correlations between Teacher Process Variables from the Expanded Brophy-Good Dyadic Observation System and Student Residual Gain Scores (Averaged across Four Years) on the Metropolitan Achievement Tests.[1]

Process Variables	Whole Class Interaction, Mornings					Whole Class Interaction, Afternoons					Reading Groups				
	WK	WD	R	AC	AR	WK	WD	R	AC	AR	WK	WD	R	AC	AR
A. Selecting Respondents to Questions															
1. ♀ Preselects Respondent before Asking Questions	-19	-10	05	-01	-20	-30	-23	-11	-17	-29	-47	-23	-43	-30	-43
	-13 -27	-04 -17	13 -00	45 -35	45 -34	-07 -40	-22 -34	19 -25	-07 -22	04 -32	11 -63	-06 -34	04 -61	45 -61	68 -74
2. Calls on Non-Volunteer	14	11	-01	-05	07	15	10	10	11	03	01	09	11	13	16
	40 08	29 05	14 -03	13 -17	-16 -07	25 21	14 24	27 12	38 -19	11 01	46 -18	30 -29	11 -21	29 00	37 13
3. Calls on Volunteer	22	30	16	13	48	-02	04	-04	-06	10	25	34	26	-04	03
	-27 39	-15 50	-62 44	-55 58	-28 56	-22 03	-05 -05	-32 03	-37 35	-27 24	-36 48	04 44	-35 50	-56 34	-93 47
4. Student Calls Out Answers	-26	-36	-20	-09	-22	10	-15	-07	-03	-02	-17	-28	-05	03	-02
	-04 -30	-15 -42	55 -39	23 -23	-03 -24	-10 -07	-15 -07	01 -04	-08 02	05 -03	-14 -16	-45 -12	34 -15	28 -17	20 -08
B. Difficulty Level of Questions															
5. Process Questions/ Process + Product Questions	08	10	-01	-08	04	18	02	04	-16	-05	16	22	06	19	03
	-42 12	-37 15	-41 -00	-40 -01	-68 11	13 20	-17 09	-55 23	-42 -04	-13 -05	41 06	55 04	27 -05	36 08	67 -06
6. Choice Questions/ Process + Product + Choice	09	14	14	25	29	-21	-15	-17	-11	-00	-08	-20	-16	-20	01
	63 -05	62 -03	07 12	28 24	66 26	-34 -16	-14 -01	10 -43	-10 -20	19 -12	-30 16	-20 -13	-42 20	-60 32	-81 35

C. Quality of Children's Answers

7. % Correct	-27	-21	-33	-28	-27	-01	09	-02	00	08	-05	07	04	04	-08
	-56 -31	-60 -13	-40 -60	-14 -53	34 -44	-03 -05	-02 09	-10 -06	11 -13	86 -10	29 -40	02 -08	35 -39	40 -31	90 -39
8. % Part-Correct	11	04	36	36	39	02	-21	-07	-29	-17	05	-11	16	07	-01
	07 11	-04 04	22 41	09 51	-76 49	-09 03	-06 -33	-22 -06	-57 -15	-65 -12	-34 15	-43 -03	-23 27	19 00	-01 -00
9. % Wrong	15	11	08	05	14	01	01	12	23	11	-02	-01	-09	-19	06
	32 15	43 -09	03 24	-25 43	-35 31	-10 09	-17 17	12 15	16 33	-35 27	-39 44	-04 27	-29 31	-60 36	-82 46
10. % "Don't Know"	24	18	45	07	15	14	09	27	24	11	09	06	10	06	03
	14 27	15 18	55 42	-07 15	-37 25	08 34	10 21	36 42	42 04	-14 15	14 05	10 02	-19 18	11 05	-19 09
11. % No Response	08	12	02	16	-07	-05	-05	-14	-17	-21	09	-08	-04	18	06
	47 10	44 20	41 12	68 -21	75 -22	19 -19	23 -16	02 -20	-24 -12	-74 -24	29 08	19 -17	02 07	25 13	-20 12

D. Teacher Reactions to Correct Answers

12. Praise	23	-01	25	03	22	-07	-09	12	-05	-11	-04	-06	-19	-02	-12
	-05 28	-24 04	-16 35	-18 12	02 24	-24 -01	-35 02	03 16	-02 -07	-77 -03	36 -21	07 -16	06 -34	11 -09	24 -19
17. Criticizing for calling out	39	20	42	17	33	-23	-16	07	17	07	-10	-01	20	16	13
	-- 40	-- 19	-- 44	-- 21	-- 34	-48 -13	-26 -08	-04 18	16 19	-21 12	-- -13	-- -06	-- 19	-- 22	-- 14
13. Failure to Give Feedback	-06	-19	-02	12	13	-17	-17	02	18	09	-05	-09	18	06	30
	-08 -05	-25 -16	07 -04	-07 24	-75 20	-35 -14	-45 -10	-26 09	18 18	-16 12	-45 11	-18 -05	-15 35	-22 26	-21 35

14. Process Feedback	03	-15	02	-07	19	31	15	24	13	37	17	-06	22	21	27					
	-08 38	-23 10	-01 41	-28 35	-07 47	-05 50	-12 34	-19 50	10 16	33 39	27 17	-14 05	04 42	17 24	42 29					
15. New Question	11	11	-09	-10	05	08	00	-02	20	-02	-07	04	-16	08	-09					
	-58 32	-35 28	-49 -01	-37 05	-79 12	20 13	-03 29	02 12	40 -06	-24 05	31 -26	32 -17	35 -48	59 -26	82 -25					
E. Teacher Reactions to Part-Correct Answers																				
16. Praise	00	-12	-20	-05	-11	-19	-14	-22	-39	-17	--	--	--	--	--					
	-- -10	-- -24	-- -50	-- -17	-- -17	-45 --	-18 --	-39 --	-66 --	-91 --	-- --	-- --	-- --	-- --	-- --					
18. Criticism	12	06	19	27	38	--	--	--	--	--	--	--	--	--	--					
	15 49	20 17	30 51	42 21	-- 37	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --					
19. Failure to Give Feedback	--	--	--	--	--	-16	07	-24	-54	-28	09	-02	16	02	16					
	-- --	-- --	-- --	-- --	-- --	-45 -09	-18 16	-39 -20	-66 -48	-91 -23	-- 09	-- -06	-- 16	-- 05	-- 18					
20. Process Feedback	10	10	35	00	11	56	37	41	11	32	05	-11	16	-04	27					
	16 28	43 -04	58 51	-01 18	10 42	61 54	36 34	-22 52	-06 16	28 33	-28 17	-32 01	-44 45	-52 23	-- 30					
21. Gives the Answer	08	06	-19	-20	-16	-14	-01	13	-00	-05	36	47	35	03	09					
	-04 24	-53 47	-33 -09	-12 -28	-01 -26	13 -21	44 -15	52 02	-07 01	-17 -04	-47 46	-50 59	-47 42	-02 12	-85 14					
22. Calls on Someone Else	14	22	19	08	14	02	09	08	22	31	-18	-06	-08	-05	04					
	-18 02	20 08	-42 14	-37 12	-98 10	-01 00	-29 14	15 03	30 20	54 30	-45 -09	-11 -03	-51 13	-28 07	-85 12					
23. Another Student Calls Out the Answer	-06	05	14	-15	-10	-40	-10	-42	-64	-39	-52	-37	-31	-33	-52					
	13 04	38 -08	51 36	-12 11	10 15	-45 -44	-18 -04	-39 -49	-66 -65	-91 -40	-55 -60	-35 -46	-22 -39	37 -56	-69 -55					
24. Repeats, Rephrases, or Asks New Question	29	23	03	48	43	-24	-25	-41	-45	-41	-15	-19	-29	-08	-22					
	44 24	20 25	-28 19	33 67	44 60	03 -34	25 -40	-29 -46	-54 -42	-24 -50	49 -32	54 -35	32 -44	29 -34	85 -38					

25. Repeats Question	-12	-14	-31	24	05	-38	-20	-42	-51	-54	08	-12	-25	11	11
	50 -49	10 -17	-25 -23	34 40	63 19	-52 -49	-08 -21	-34 -66	-57 -67	-87 -58	34 -04	13 -33	-24 -36	12 01	77 -02
26. Rephrases or Gives Clue	43	45	29	24	41	-12	-21	-25	-18	-18	-15	02	01	-06	-14
	-18 50	22 44	-28 34	-22 39	-98 49	16 -22	10 -29	-19 -25	-25 -11	-13 -19	16 -26	33 -12	58 -21	13 -17	-44 -16
27. Asks New Question	19	04	16	25	31	16	08	06	-09	-21	-38	-27	-30	-24	-37
	-04 10	09 -13	11 00	15 21	-98 29	70 00	64 -16	31 -06	17 -23	39 -29	11 -51	-07 -37	33 -58	16 -49	-85 -35
F. Teacher Reactions to Wrong Answers															
28. Praise	-31	-18	-12	-36	-21	05	-07	21	-01	-01	-21	-37	-25	-09	-21
	-60 -01	-19 -11	-13 16	-44 -14	-95 -07	-27 05	-32 -11	-17 22	34 -04	-12 -02	-- -27	-- -51	-- -36	-- -13	-- -23
29. Criticism	02	-10	08	25	08	-40	-06	-41	-44	-39	-05	-20	-03	26	07
	-23 43	-28 19	-00 48	41 22	15 34	-27 -44	-32 -05	-17 -49	34 -65	-12 -40	-02 -14	-28 -12	04 11	41 21	31 12
30. Failure to Give Feedback	-22	-11	-16	-45	-20	-11	-17	15	12	-01	07	-01	10	15	--
	-32 --	-07 --	-06 --	-60 --	-73 --	-27 -13	-32 -23	-17 15	34 05	-12 -01	28 --	13 --	38 --	25 --	-- --
31. Process Feedback	-21	-22	-12	-18	-07	13	05	27	33	26	10	-05	25	11	35
	-39 43	-33 19	03 48	-16 22	-73 34	14 22	13 07	43 33	48 23	02 27	-08 16	-11 -03	-01 36	-22 32	06 37
32. Gives the Answer	12	24	40	34	27	03	-02	06	21	05	-22	-27	-11	05	-05
	31 03	21 21	75 27	29 34	42 25	02 19	-10 31	15 25	39 10	18 06	-23 -30	-39 01	03 -10	14 -08	11 -19
33. Calls on Someone Else	11	22	02	-02	16	-13	-08	-03	-13	-02	30	41	20	-11	-06
	-20 18	-03 30	-64 20	-31 11	-49 26	-25 -17	-31 -12	-16 -11	-36 -04	38 -06	08 37	28 41	-41 39	-37 06	-72 -00
34. Another Student Calls Out the Answer	-21	-26	-20	-03	-22	10	-08	11	30	21	-12	-28	-08	16	04
	08 -32	15 -46	31 -43	20 -16	-50 -18	-01 31	-26 21	16 21	36 34	61 35	-17 -03	-54 19	-02 03	32 -07	31 -09
35. Repeats, Rephrases, or Asks New Question	23 11	10 54	11 -03	44 -08	21 01	-08 19	-10 -10	-01 -03	02 -20	-08 16	12 -08	-06 32	06 -11	-27 -08	-07 08	-06 -14	-01 33	-22 -07	39 -31	12 16	09 15	28 13

36. Repeats Question	-12	-03	-21	-33	=50	-03	-08	-05	-03	-08	-20	-08	-29	-18	-11
	-17 -17	16 -15	-30 -30	-17 -53	-35 -53	-15 03	-28 06	-05 -03	05 -09	06 -20	09 -40	22 -23	-02 -47	-02 -38	27 -24
37. Rephrases or Gives Clue	30	17	13	20	22	07	03	10	15	06	02	02	01	16	26
	40 28	31 12	45 02	13 23	25 23	22 17	17 24	41 13	32 05	-30 13	03 -03	34 -15	65 -19	-04 23	-03 28
38. Asks New Question	-06	01	-09	10	06	-14	-09	-27	-02	-07	07	03	15	16	-09
	13 -02	34 -10	44 -27	30 10	53 08	-10 -26	-19 16	-32 -31	08 -19	-28 -04	01 06	-01 -00	20 09	48 -02	33 -16
G. Teacher Reactions to "I Don't Know" or No Response															
39. Criticism	22	-04	25	28	27	-33	-19	-33	-13	-25	--	--	--	--	--
	-02 40	-33 18	04 46	36 22	33 34	-30 -44	-37 -05	-22 -49	33 -64	-12 -40	-- --	-- --	-- --	-- --	-- --
40. Failure to Give Feedback	08	11	09	-00	--	18	06	-15	-04	03	29	27	23	14	35
	-- 04	-- 06	-- 04	-- -01	-- --	51 --	22 --	-27 --	-08 --	28 --	46 24	60 16	07 22	-02 19	-- 38
41. Gives the Answer	30	20	-03	-06	11	-16	-21	-05	-10	-38	19	15	26	13	13
	37 30	14 23	-39 10	-27 08	-13 17	-09 -19	-27 -22	-31 03	29 -31	-01 -47	19 40	27 16	54 19	10 28	14 38
42. Calls on Someone Else	17	04	25	17	06	-15	-10	-26	-08	-05	17	09	23	10	07
	-28 28	-04 02	01 31	03 24	-63 14	-55 -06	-85 11	-29 -37	06 -15	12 -08	-22 38	-26 25	-- 30	01 16	-- 13
43. Another Student Calls Out the Answer	-45	-22	-44	-50	-59	-02	05	28	23	17	-19	03	-12	-16	-21
	-15 -57	-24 -34	-11 -62	04 -67	-40 -61	19 -07	31 -03	67 17	18 25	21 17	59 -36	20 -06	32 -30	37 -30	20 -22
44. Repeats, Rephrases, or Asks New Question	30	21	11	-01	24	07	20	-07	-10	-15	-02	02	-28	-01	16
	17 53	10 34	-07 26	-34 18	-12 26	49 -11	64 07	01 -04	-16 -07	-73 -10	-21 27	-01 26	-43 -04	-20 29	-17 32
45. Repeats Question	19	-03	-14	-11	28	-01	-08	14	-17	-21	-17	-29	=40	-29	-11
	07 49	-07 16	-37 13	-38 25	-24 31	06 -03	15 -16	45 05	-25 -13	-44 -20	-36 00	-38 -27	-61 -34	-56 10	-90 10
46. Rephrases or Gives Clue	24	24	22	01	09	09	09	-08	05	-16	05	19	-04	16	29
	14 30	31 26	51 18	-04 03	-03 11	27 15	42 09	-03 08	08 01	-79 -09	11 17	35 39	10 04	26 19	92 27

47. Asks New Question	-03	06	11	-08	-33	03	32	-14	-11	05	19	24	14	24	29
	11 -14	11 -05	30 -02	34 -23	-- -36	57 -17	63 18	-22 -13	-28 -00	03 05	06 41	12 50	10 29	23 31	67 33
H. Teacher Reactions Combined across All Response Opportunities															
48. Praise	15	-08	15	-04	14	-12	-12	07	-10	-17	-08	-09	-21	-05	-16
	-13 22	-33 -01	-26 27	-21 05	-02 16	-30 -09	-43 -02	-05 08	-00 -15	-64 -13	38 -26	07 -22	09 -39	11 -12	32 -23
49. Failure to Give Feedback	-06	-17	-03	05	10	-17	-15	04	13	08	06	01	25	11	33
	-15 -03	-25 -14	01 -04	-25 22	-82 18	-40 -14	-49 -10	-35 10	07 16	-26 11	-26 16	02 -01	-- 34	-17 27	-21 38
50. Process Feedback	02	-13	11	-05	20	33	15	41	34	36	14	-07	27	16	32
	-19 43	-22 14	08 55	-27 34	-32 50	02 40	-15 23	18 47	59 25	03 39	06 18	-23 02	-06 44	-04 27	41 31
51. New Question	07	10	-12	-16	-01	11	-06	-00	17	-03	-12	03	-20	-00	-14
	-59 26	-33 25	-46 -09	-41 -04	-83 05	24 12	01 28	01 10	40 -12	-18 00	27 -30	25 -16	34 -52	59 -31	83 -28
52. Repeat, Rephrase, or New Question after Failure to Answer	47	36	25	26	36	-08	-08	-32	-22	-29	-18	-18	-28	13	14
	57 52	54 28	18 28	-11 47	-34 45	34 -16	37 -13	-12 -31	-12 -30	-64 -30	08 -25	10 -27	17 -44	36 -02	81 07
53. Repeats Question after Failure to Answer Correctly	17	16	-02	06	06	-11	-08	-14	-31	-24	-15	-27	-35	-09	-02
	57 04	52 -01	-22 16	-12 24	-25 10	-27 -02	-16 02	-17 -09	-56 -11	-83 -19	-21 -08	-18 -34	-46 -25	-23 07	-65 09
54. Gives the Answer after Failure to Answer Correctly	26	25	32	19	27	-07	-11	04	01	-19	02	01	08	-12	-00
	26 33	02 48	40 38	-01 39	-01 36	-12 -01	-15 02	06 16	17 -23	-34 -32	-41 40	-24 37	-06 36	-34 11	-74 17
55. Calls on Another Student after Failure to Answer Correctly	23	25	21	21	21	-16	-07	-02	-00	-06	22	17	07	-09	05
	19 30	34 25	-11 47	06 36	-54 36	-16 -27	-36 04	16 -25	-08 07	-42 -00	-24 55	03 36	-51 51	-43 23	-91 28
56. Another Student Calls Out Answer after Failure to Answer Correctly	-34	-29	-31	-29	-37	10	08	22	14	15	-14	-23	-10	03	01
	03 -48	15 -50	36 -56	-04 -44	-37 -40	01 26	05 26	47 21	03 33	-05 36	-33 -01	-61 09	-21 06	-01 05	-48 09

I. Student Response Opportunities

57. Response Opportunities/ Total Teaching Time	38	29	33	24	39	25	35	22	06	11	14	13	-08	09	20					
	-20 55	-12 40	-26 47	-34 54	-75 55	-10 29	-08 42	-17 24	-11 13	-48 18	07 13	-22 17	-29 -10	-21 20	10 23					
J. Student Initiated Questions (SIQ's)																				
58. % SIQ's Irrelevant	02	03	-07	23	08	02	-10	-22	05	18	17	13	37	37	44					
	13 11	04 37	02 07	51 -05	17 09	-29 20	-27 10	-43 -05	-10 19	02 18	16 17	07 29	79 39	56 23	-43 51					
59. % SIQ's Called Out	10	04	03	-00	16	-18	-26	-14	03	-06	09	10	17	20	22					
	-10 20	-21 27	-10 17	-17 03	-58 26	35 -30	-02 -31	42 -25	51 -16	99 -14	39 -02	24 04	36 16	49 06	-78 26					
60. Praise of Question after Relevant SIQ	--	--	--	--	--	39	16	47	25	45	--	--	--	--	--					
	-- --	-- --	-- --	-- --	-- --	-- 40	-- 10	-- 46	-- 30	-- 45	-- --	-- --	-- --	-- --	-- --					
61. Criticism of Question after Relevant SIQ	06	03	31	07	08	39	19	45	20	35	--	--	--	--	--					
	-- 05	-- -03	-- 31	-- 09	-- 09	-- 41	-- 18	-- 47	-- 23	-- 35	-- --	-- --	-- --	-- --	-- --					
62. % Relevant SIQ's Delayed	36	36	25	12	14	-23	-21	-01	-14	-03	27	30	-07	-05	08					
	-- 36	-- 35	-- 21	-- 17	-- 15	-52 -13	-30 -14	-33 19	-67 21	-95 13	50 18	62 -08	15 -16	-24 07	-- 11					
63. % Relevant SIQ's Not Accepted	25	23	20	04	21	18	05	19	01	13	-49	-28	-23	-16	-40					
	-20 37	-22 44	-10 31	-02 07	55 18	-- 17	-- -02	-- 14	-- 00	-- 11	-41 -62	-29 -27	13 -37	61 -65	-16 -66					
64. % Relevant SIQ's Given Brief Feedback	28	14	06	25	35	-13	-17	-13	15	17	50	59	71	52	61					
	-24 41	-11 25	-06 09	15 29	03 42	09 -22	-20 -13	17 -25	49 -05	95 13	40 60	52 68	40 77	32 66	82 66					
65. % Relevant SIQ's Given Long Feedback	-30	-23	-13	-17	-30	25	34	32	16	09	-34	-48	-32	-15	-49					
	54 -56	11 -44	08 -22	13 -34	42 -45	34 21	46 24	12 27	09 18	-- 05	-37 -47	-35 -66	29 -62	18 -47	-10 -49					
66. % Relevant SIQ's Redirected to Class	-23	-17	-22	-42	-19	19	03	10	21	--	-18	20	-14	-24	-04					
	-56 -14	-20 -06	-49 -02	-78 -02	-85 -09	08 21	09 -01	34 03	45 13	-- --	-- -18	-- 27	-- -21	-- -25	-- -00					

67. Behavioral Praise of Relevant SIQ	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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68. Behavioral Criticism of Relevant SIQ	55		49		47		13		32		41		17		57		26		42		--		--		--		--		--	
	--	57	--	54	--	49	--	18	--	33	--	43	--	14	--	60	--	30	--	42	--	--	--	--	--	--	--	--	--	--
69. Behavioral Warning after Relevant SIQ	--		--		--		--		--		06		-07		11		01		11		26		14		-13		-03		07	
	--	--	--	--	--	--	--	--	--	--	--	04	--	-14	--	07	--	01	--	09	62	--	24	--	-24	--	-13	--	-08	--
70. Criticism of Question after Irrelevant SIQ	--		--		--		--		--		-35		-18		-42		-51		--		-06		-41		-04		21		-06	
	--	--	--	--	--	--	--	--	--	--	-12	--	-00	--	-41	--	-46	--	--	--	-55	30	-44	-35	-42	22	36	12	--	15
71. % Irrelevant SIQ Given No Feedback	-22		-48		-20		26		-15		03		-14		37		-10		25		08		10		08		24		27	
	-50	--	-46	--	-27	--	43	--	-82	--	-33	-09	-34	-23	-53	56	-60	04	--	14	-07	43	11	88	13	24	18	50	--	50
72. % Irrelevant SIQ Delayed	11		-05		20		-01		17		13		16		05		-03		71		--		--		--		--		--	
	--	10	--	-34	--	14	--	04	--	18	-33	38	-34	45	-53	17	-60	74	--	72	--	--	--	--	--	--	--	--	--	--
73. % Irrelevant SIQ Given Brief Feedback	44		12		36		20		31		-33		-33		-37		18		-94		35		-35		47		33		62	
	08	48	-14	16	-13	40	-05	29	-90	42	-40	-44	-31	-38	17	-84	81	-78	--	-92	-38	87	-67	71	-18	91	-21	79	--	78
74. % Irrelevant SIQ Given Long Feedback	-17		-45		-13		10		17		15		15		27		43		72		-25		-16		-16		16		01	
	-36	--	-10	--	34	--	-16	--	90	--	-03	34	-16	42	54	17	35	68	--	70	-32	-20	-21	-49	--	-25	63	09	--	10
75. % Irrelevant SIQ Not Accepted	-43		03		-27		-36		-42		34		40		02		-17		68		-54		08		-43		-63		-82	
	-36	-51	-46	-06	-02	-44	-39	-31	--	-48	77	22	72	31	20	15	-23	48	--	61	15	-71	17	-27	42	-70	--	-90	--	-90
76. % Irrelevant SIQ Redirected to Class	--		--		--		--		--		--		--		--		--		--		32		33		24		29		47	
	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	43	--	88	--	24	--	50	--	50
77. Behavioral Criticism after Irrelevant SIQ	--		--		--		--		--		--		--		--		--		--		--		--		--		--		--	
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88. % Relevant SIC's Which Cause A Shift In Topic	78	-37	-15	12	-00	-11	-29	-08	17	-08	-19	-27	-09	26	-01
	-51 11	-59 -03	-40 34	15 16	-21 19	-04 -14	-09 -40	22 -17	54 -09	-21 -07	-45 -18	-40 -29	-18 04	47 13	-72 09
89. Behavioral Praise after Relevant SIC's	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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90. Behavioral Criticism after Relevant SIC's	41	20	48	19	36	-14	01	-08	-02	-40	-19	-24	-14	18	-07
	-- 42	-- 19	-- 50	-- 24	-- 37	16 -45	14 -05	38 -48	39 -65	-- -41	-46 -48	-41 -26	-21 -23	47 -50	-67 -56
91. Behavioral Warning after Relevant SIC's	-24	-00	-11	-33	-20	--	--	--	--	--	-18	-11	16	10	08
	-- -30	-- -09	-- -19	-- -41	-- -22	-- --	-- --	-- --	-- --	-- --	-- -18	-- -16	-- 16	-- 14	-- 10
92. Praise of Comment after Irrelevant SIC's	-25	-28	-21	-47	-32	33	28	23	-02	08	--	--	--	--	--
	-57 02	-22 -24	-59 17	-79 -04	-84 06	-- 35	-- 27	-- 22	-- 01	-- 09	-- --	-- --	-- --	-- --	-- --
93. % Irrelevant SIC's Given No Feedback	04	03	09	24	23	-01	-13	-26	00	12	09	08	-34	-34	-25
	11 10	16 07	38 04	31 23	89 25	64 -21	43 -23	-38 -14	-45 06	-- 18	56 -59	25 -04	-39 -62	-32 -86	-08 -78
94. % Irrelevant SIC's Delayed	11	-10	-11	10	10	-19	-03	-16	-01	14	-10	-34	-13	-21	16
	-- 04	-- -30	-- -21	-- 09	-- 03	-- -21	-- -11	-- -23	-- 03	-- 15	-54 22	-65 -08	-51 16	-59 05	-- 17
95. % Irrelevant SIC's Not Accepted	09	19	-10	-32	-41	34	38	55	37	43	27	33	21	42	25
	72 -22	71 -10	05 -15	-20 -67	-- -58	20 37	27 37	87 48	61 36	-- 47	-64 73	-54 88	-26 43	46 42	-82 48
96. % Irrelevant SIC's Accepted	-21	07	07	01	01	-18	-12	-16	-22	-23	-20	-10	-07	-03	03
	-69 -21	-59 25	-60 18	-10 02	-63 14	-69 -10	-60 -02	-31 -16	-03 -26	-- -28	17 -47	31 -34	39 -25	-18 -00	90 -09
97. % Irrelevant SIC's Integrated Into Discussion Topic	-20	-39	-11	-41	-20	-63	-21	-44	-50	-63	06	02	12	27	--
	-71 05	-59 -20	-80 23	-85 -06	-84 06	-06 -69	45 -37	-22 -52	-23 -53	-- -63	03 --	12 --	45 --	46 --	-- --
98. % Irrelevant SIC's Which Cause a Shift In Topic	-12	-22	00	07	-37	--	--	--	--	--	06	-21	26	06	10
	10 05	-01 01	46 14	24 -04	-84 --	-- --	-- --	-- --	-- --	-- --	-- 16	-- -35	-- 23	-- 19	-- 12

99. Behavioral Criticism after irrelevant SIC's	12	02	-08	11	22	-31	-07	-27	-34	-43	-10	-34	-13	-21	16
	-31 15	-57 11	-41 -07	-24 20	-- 20	26 -51	08 -09	67 -60	29 -66	-- -43	-54 22	-65 -08	-51 16	-59 05	-- 17
100. Behavioral Warning after irrelevant SIC's	14	-16	18	-12	11	14	12	15	22	30	14	-02	19	-01	16
	-31 25	-57 -03	-41 34	-24 -07	-- 05	-- 14	-- 08	-- 13	-- 28	-- 31	-- 22	-- -08	-- 16	-- 05	-- 17
M. Self and Opinion Questions															
101. Self Questions/ Process + Product + Choice Questions	-38	-19	-36	-33	-18	-09	-28	-08	-17	-01	03	-14	-10	-01	12
	-22 -43	-29 -17	-34 -39	-25 -37	52 -25	-39 -05	-45 -28	-45 -02	-41 -08	15 -03	18 -02	22 -35	-10 -07	-10 08	62 04
102. % Self Questions Which Were Subject-Matter Related	14	14	48	68	--	--	--	--	--	--	--	--	--	--	--
	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --
103. % Self Questions Related to Personal Preference	87	87	65	44	--	--	--	--	--	--	--	--	--	--	--
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104. Opinion Questions/ Process + Product + Choice Questions	26	31	-03	-04	-10	-26	-40	-36	-22	-34	-13	-14	-18	-22	-17
	32 21	44 20	-07 -11	-02 -07	-21 -11	-28 -29	-48 -58	-34 -43	-24 -22	-- -36	09 -23	13 -30	-09 -24	-11 -32	58 -32
105. % Opinion Questions Given No Feedback	--	--	--	--	--	-31	-22	-13	-51	-79	-09	14	-03	06	08
	-- --	-- --	-- --	-- --	-- --	-- -37	-- -34	-- -22	-- -71	-- -79	-08 -61	11 16	17 -59	44 -78	99 -53
106. % Opinion Questions Followed by Praise	-52	-38	-43	-55	-73	-38	-39	-21	-58	-79	08	09	21	35	--
	-- -71	-- -49	-- -60	-- -62	-- -78	-64 -37	-68 -34	-25 -22	-11 -71	-- -79	04 --	07 --	39 --	69 --	-- --
107. % Opinion Questions Followed by Teacher Disagreement	01	04	16	-05	--	35	-02	34	19	-66	-04	07	46	36	27
	-- -06	-- 00	-- 09	-- -04	-- --	-64 36	-68 -02	-25 29	-11 10	-- -66	-03 -01	04 11	20 53	44 36	-- 34
108. % Student Opinions Accepted	-03	03	-07	20	27	04	44	00	13	75	-21	-39	-49	-27	-33
	-- 11	-- 13	-- 09	-- 20	-- 33	64 -14	68 26	25 -11	11 13	-- 75	-58 -16	-49 -40	-59 -47	-47 -23	99 -35

109. % Student Opinions Integrated Into Discussion Topic	-21	-32	-32	-59	-61	-27	-45	-21	-30	-79	-20	07	09	-41	-47
	-- -41	-- -47	-- -55	-- -68	-- -69	-64 -37	-68 -34	-25 -22	-11 -71	-- -79	11 -39	31 -18	69 -30	-04 -68	-59 -68
N. Private Dyadic Contacts															
110. % Private Contacts Student Initiated	12	-10	15	06	27	21	-00	27	32	20	32	46	26	35	38
	49 06	04 -15	-17 22	-01 09	35 26	11 29	-23 11	-01 46	40 26	21 24	21 37	-09 71	19 28	31 37	87 39
111. Student Initiated Work Contacts Involving Praise	-17	-25	-13	01	-19	-14	-06	-03	24	05	-24	-04	-07	-27	-39
	-57 -09	-62 -15	-49 -05	-16 07	-26 -20	15 -30	20 -24	25 -18	40 12	53 -03	23 -26	22 -08	-20 -08	-47 -24	-74 -38
112. Student Initiated Work Contacts Involving Criticism	12	04	22	19	27	09	01	13	16	18	-31	-04	-20	-36	-21
	13 13	11 04	22 25	-11 33	-23 36	30 04	05 10	36 12	30 04	69 15	-28 -48	-07 00	33 -51	-24 -66	-42 -40
113. % of Private Work Contacts Student Initiated	09	01	20	23	35	-01	03	04	26	10	06	-09	35	19	09
	-03 10	-14 00	-20 28	01 34	70 33	11 -06	-- 03	27 -06	57 05	61 03	01 08	-15 -08	-10 46	02 25	-30 11
114. % Student Initiated Contacts Delayed	-26	04	-28	-32	-41	-03	25	-04	-08	08	37	62	27	21	41
	-13 -35	-24 03	-29 -41	-33 -37	-67 -44	-45 -03	-19 26	01 -18	-05 -11	50 07	09 42	09 72	-78 36	-61 35	09 46
115. % Student Initiated Contacts Given Brief Feedback	19	05	21	27	51	-03	-02	11	28	19	20	-09	44	29	22
	-17 28	-34 18	-29 35	-13 45	61 51	-14 02	-14 08	02 20	47 18	15 21	09 23	-27 -03	15 53	30 30	17 22
116. % Student Initiated Contacts Given Long Feedback	-15	-18	03	-01	-16	04	-04	-10	-03	-19	-38	-29	-32	-30	-43
	39 -33	41 -47	21 -09	40 -20	81 -26	41 -12	23 -22	35 -38	11 -13	69 -35	-03 -53	27 -53	-26 -35	-37 -31	-37 -46
117. % Student Initiated Contacts Involving Personal Concerns	-37	-30	-51	-40	-55	-17	-15	-13	-23	-08	-26	03	-34	-33	-19
	-00 -46	-02 -35	-04 -65	-06 -63	-62 -57	-45 -00	-21 -04	-10 -10	-39 -05	-67 08	-16 -25	-19 04	-02 -42	09 -34	85 -18
118. % Student Initiated Requests Granted	33	34	20	30	45	12	-14	07	01	-14	-01	04	-04	-00	-20
	02 51	37 45	21 33	-05 52	27 48	-05 16	-08 -21	-37 21	-21 14	-56 -09	-16 -02	-46 12	-26 -01	27 -07	40 -22

119. % Student Initiated Requests Delayed	-17	-22	-15	-27	-47	-10	07	01	08	26	28	28	08	03	39
	33	-33	08	-46	02	-30	25	-49	54	-58	-48	04	-22	25	-07	-03	-11	22	66	24	60	17	72	11	03	16	-71	29	15	44
120. % Student Initiated Requests Not Granted	-22	-23	-16	-01	-08	00	11	-04	03	16	-31	-40	-15	-02	03
	07	-34	-43	-15	-09	-24	38	-23	26	-11	31	-10	16	16	28	-14	22	-12	48	12	-61	-26	-40	-43	29	-22	63	-06	-59	08
121. Private Work Contacts/ Private Work Contacts + Public Response Opportunities	-31	-36	-13	-06	-15	08	-09	22	15	25	-10	-17	01	12	05
	-01	-37	-19	-40	-04	-11	33	-22	57	-22	13	07	14	-19	20	26	08	20	65	21	01	-14	-01	-24	28	-08	23	03	35	00
122. Procedural Contacts/ Procedural Contacts + Response Opportunities	-43	-35	-34	-20	-25	03	-11	09	03	22	-14	-15	-01	00	06
	-51	-17	-34	07	-37	39	-43	69	-34	04	04	10	-15	06	14	-16	13	54	19	-05	-18	07	-22	22	-09	11	-09	34	00
123. Teacher Initiated Work Contacts/ Teacher Initiated Work + Procedure Contacts	-07	-07	13	-02	-25	04	-02	09	-01	-07	-23	-31	-18	-09	-54
	-09	-12	20	-23	06	08	07	-07	-51	-25	10	04	25	-11	20	09	-09	04	23	-11	20	-36	37	-69	16	-28	08	-18	-60	-53
124. Teacher Initiated Work Contacts Involving Praise	-19	-06	-26	-17	-14	-23	-12	-28	-01	-19	11	17	23	40	31
	-52	-17	-13	-12	-35	-33	-56	-05	-93	-08	-16	-29	-20	06	-17	-48	30	-53	-29	-33	07	18	16	17	41	14	50	26	72	28
125. Teacher Initiated Work Contacts Involving Mere Observation	15	20	25	14	22	-34	05	-36	-51	-38	-25	-22	01	-04	-21
	34	08	24	13	-18	34	-10	25	12	23	-13	-39	07	01	-30	-43	-33	-62	-61	-38	-37	-24	-42	-20	-24	-01	36	-16	-15	-21
126. Teacher Initiated Work Contacts Involving Brief Feedback	06	06	14	-09	01	-33	-03	-31	-32	-23	04	-00	-16	-06	09
	11	03	05	02	-36	18	-38	-03	-13	02	-13	-38	-39	-01	-02	-41	36	-50	73	-27	-17	16	-21	17	-44	07	-38	26	--	08
127. Teacher Initiated Work Contacts Involving Long Feedback	-18	-04	-39	-46	-39	-33	-02	-34	-50	-50	-13	-02	-17	-07	-28
	-20	-43	-16	-06	38	-51	36	-63	06	-41	22	-45	33	-15	22	-51	-12	-65	-47	-50	21	-33	26	-27	47	-56	35	-47	02	-35
128. % Teacher Initiated Procedural Contacts Which Were Management Requests	-27	-25	-41	-22	-35	-09	-03	-04	-05	20	27	20	02	06	21
	-07	-54	-29	-24	13	-52	29	-39	58	-42	-33	-05	-25	02	-07	-07	-23	03	64	16	-46	35	-21	35	-11	12	-68	10	-82	23

129. % Teacher Thanks Student for Doing a Favor Request	15		10		-16		-06		-05		-15		-06		01		14		13		20		11		-06		00		11	
	57	-00	38	04	-06	-15	-03	-10	14	-27	-04	-22	10	-18	01	02	23	07	52	08	43	-11	22	-51	-15	04	-30	10	-31	05
130. % Teacher Thanks Student Following a Management Request	-11		11		-24		-33		-15		-22		-14		03		-02		-16		18		08		14		03		23	
	52	-45	37	-04	15	-49	-08	-56	15	-26	06	-30	-15	-23	25	-05	34	-08	36	-18	55	16	33	05	-05	16	-10	08	26	24
O. Combined Teacher Evaluation Statements																														
131. Academic Praise/ Academic Praise + Academic Criticism	23		-02		21		32		34		-04		03		-11		07		-04		23		14		20		22		16	
	-58	46	-53	23	-35	38	-18	55	04	38	-16	-03	18	-09	-21	-15	-15	20	-43	-01	54	18	26	-13	24	09	33	25	78	21
132. Behavioral Praise/ Total Behavioral Contacts	10		-04		-13		-04		-02		05		-00		05		-06		05		20		01		-25		01		09	
	-08	10	-12	-07	-38	-15	-40	02	-69	00	-28	08	-15	-01	-52	10	-53	07	-84	09	55	16	20	-05	-40	-23	-27	09	-03	09
133. Behavioral Warnings/ Behavioral Warnings + Behavioral Criticism	31		35		09		21		42		06		03		20		25		13		06		05		-20		-08		45	
	04	37	35	37	36	04	-19	37	35	43	01	09	-02	07	08	29	36	18	52	10	31	-02	28	-09	-29	-17	-74	12	82	48
P. Discipline and Control Errors																														
134. % Discipline Contacts Involving One or More Error	-24		-14		-21		-23		-41		-19		-01		-21		-03		13		-20		05		-17		02		-16	
	12	-33	11	-23	-09	-25	-03	-32	35	-49	-08	-18	-01	19	-12	-12	-07	04	82	06	03	-39	10	-03	22	-41	47	-31	-01	-14
135. Target Errors/ Total Errors	13		-01		24		18		20		07		10		08		-13		00		-01		-34		10		22		--	
	-28	21	-25	07	-20	34	43	10	-72	27	12	09	35	08	41	06	-36	-00	-05	-03	-37	--	-42	--	16	--	-03	--	--	--
136. Timing Errors/ Total Errors	-22		-36		-62		-16		-04		-02		-12		02		-19		-01		-03		39		-30		-43		-24	
	-18	-23	-53	-23	-89	-49	-49	02	-17	-04	-31	02	-64	-01	-17	01	20	-32	-26	-01	62	-20	25	75	-38	-27	-29	-32	-08	-36
137. Overreactions/ Total Errors	39		47		50		38		51		-35		-38		-33		07		-24		04		-28		25		36		39	
	-04	48	21	57	07	58	38	37	76	56	-09	-48	06	-57	01	-41	26	-05	23	-29	-53	52	-47	03	-28	58	47	48	-82	77
138. Nonverbal Control Contacts/ Total Control Contacts	04		12		04		11		04		-25		-24		10		-01		-07		-37		-26		-05		-37		-43	
	-02	09	09	18	20	01	16	07	-51	09	-31	-30	-30	-35	-05	04	-24	04	-60	-05	12	-37	39	-39	34	-10	-31	-34	-45	-39

Q. Combined Teacher Feedback Data

139. Repeat/ Repeat + Rephrase + New Question	-48		-49		-46		-24		-49		-18		-17		-12		-13		-20	
	-14	-67	-50	-50	-55	-46	13	-56	21	-67	-36	-11	-37	-03	-08	-15	-12	-15	23	-36
140. Rephrase/ Repeat + Rephrase + New Question	43		38		44		12		32		11		-04		07		06		02	
	08	56	31	40	45	45	-21	33	-30	43	25	10	28	-20	22	05	-02	13	-29	06
141. Brief Feedback/ Brief + Long Feedback	22		04		15		14		41		03		-03		09		25		29	
	-05	31	-35	21	-51	38	-44	45	-09	46	-19	12	-24	12	-20	23	38	18	22	34

139. Repeat/ Repeat + Rephrase + New Question	-08		-28		-26		-00		10											
	-15	-00	-34	-16	-40	-10	-05	03	-06	13										
140. Rephrase/ Repeat + Rephrase + New Question	18		25		16		13		18											
	23	16	46	10	42	03	--	23	-16	25										
141. Brief Feedback/ Brief + Long Feedback	30		27		34		17		40											
	-24	50	-43	61	-34	63	-34	47	-38	52										

[1] For each set of 3 coefficients, the top (centered) coefficient is for the entire sample of teachers, the coefficient at the lower left is for Title I teachers, and the coefficient at the lower right is for Non-Title I teachers. Probability values are indicated by underlining. $p > .10$ where no line appears; $.10 > p > .05$ where one line appears; $p < .05$ where two lines appear.

Table 3. Correlations between Group Instruction Coding System Variables[1] and Residual Gain Scores.

Group Instruction Variables	Word Knowledge (N=10)	Word Discrimination (N=10)	Arithmetic Reading (N=10)	Arithmetic Computation (N=10)	Arithmetic Reasoning (N=8)	Rater[2] Agreement
1. Reviewing Old Material during Lessons	-50	-04	-36	-43	-59	67
2. Presenting New Material during Lessons	-41	-28	-48	-48	-68*	78
3. Practicing New Material Just Presented during Lessons	53	55*	41	42	37	51
4. Reviewing or Summarizing Lessons	-23	-05	-13	-03	-04	-19
5. Evaluating Work or Responses during Lessons	38	11	53	39	46	87
6. Eliciting Self-Evaluation from Students during Lessons	00	-04	19	30	36	04
7. Giving Assignment Instructions during Lessons	05	08	-04	00	-03	61
8. Allowing Students to Work Independently during Lessons	39	05	22	13	59	
9. Working with Individuals during Introductions to Lessons	58*	16	70**	47	59	
10. Working with More than One Child but not the Whole						

to Lessons	-34	-07	-11	08	-10	
11. Working with the Whole Group during Introductions to Lessons	-54	-15	-69**	-48	-58	
12. Presenting Demonstrations or Diagrams	40	35	43	59*	52	38
13. Lecturing	-31	-17	-16	00	02	47
14. Focused Discussion	30	27	44	33	34	83
15. Unfocused Discussion	-39	-14	-19	03	-07	09
16. Pupils Read, Recite, or Work Problems	06	03	-11	-17	-19	92
17. Pupils Read Silently	56*	35	63**	25	50	
18. Drill Activities to Promote Overlearning	--	--	--	- 73**	--	00
19. Thinking and Problem Solving Activities	12	-27	-07	-14	04	81
20. Dead Spots Due to Interruptions	-58*	-51	-71**	-45	-61	56
21. Patterned Turns	39	30	22	19	03	76
22. Non-Patterned Turns	-47	-15	-57*	-64**	-70**	93
23. Working with Individuals during Lessons	48	06	47	11	36	
24. Working with More Than One Child but not the Whole Group during Lessons	-23	-07	-04	17	-07	
25. Working with the Whole Group during Lessons	-47	-05	-48	-13	-37	
26. Use of Standardized, Published Materials during Lessons	-19	-06	-14	-23	-43	90

27. Use of Teacher Created Materials during Lessons	46	38	28	17	13	87
28. Use of Traditional Materials for Seatwork or Homework	57*	08	38	19	42	81
29 Use of Audiovisual Aids during Lessons	38	53	26	30	45	1.00
30. Games and Special Activities	44	51	59*	58*	79**	52
31. Use of Learning Centers	-25	-35	-14	05	17	89
32. Allows Students Free Choice of How to Spend Free Time	-19	-43	-27	-25	--	1.00
33. Prepares Individualized Materials for Different Children for Lessons	56*	20	65**	32	46	
34. Uses Different Materials for Different Groups for Lessons	-21	-43	-30	-12	05	
35. Uses Same Materials for All for Lessons	18	35	10	00	-13	
36. % Total Time Spent with Individuals	55*	17	65*	30	45	96
37. % Total Time Spent with Small Groups	-22	-45	-30	-16	02	97
38. % Total Time Spent with Entire Group	-39	11	-43	-19	-48	90
39. Wasted Lesson Time	-61*	-23	-55*	-32	-53	
40. % Total Time Teacher Doing Only One Thing at a Time	-37	-11	-36	-26	-29	
41. % Total Time Teacher Doing Two						

or More Things Simultaneously	65**	22	62**	40	50
42. Teacher Works Alone, Removed from Class	31	11	17	11	66*
43. Teacher Uses a Single Approach to Present a Lesson	-24	05	-13	15	00
44. Teacher Uses Multiple Approaches to Present a Lesson	13	-10	06	-21	-16
45. Teacher Monologue (Lecture, Chatter, Admonishment)	-39	-08	-26	-03	-17
46. % Total Time Teacher Uses Same Materials for All Students	-13	-09	-19	-26	-42
47. % Total Time Provides Variety or Student Choice of Materials, Activities	62**	20	51	30	64*
48. % Instructional Time Used for Review	-29	09	-09	-22	-37
49. % Instructional Time Used Presenting New Material	-01	-44	-10	-25	-11
50. % Instructional Time Used for Student Practice of Newly Presented Material	59*	64**	47	46	44
51. % Instructional Time Used Summarizing Presentations	-26	-08	-16	00	-05
52. % of Student Self Evaluation					

Which is Teacher Elicited	30	10	34	61*	79**
53. % of Lecturing Which Included Demonstrations	43	30	29	29	18
54. Direct Presentation of Material/Total Modes of Teaching	-04	-06	02	28	29
55. % of Discussion Which Is Focused by Teacher	45	07	16	-11	07
56. Discussion/Total Modes of Teaching	-17	04	-02	05	-13
57. Pupil Recitation/Total Modes of Teaching	-13	-14	-35	-41	-43
58. Oral Reading/Oral Plus Silent Reading	-10	-08	-25	-10	-24
59. Wasted Teaching Time/Available Teaching Time	-32	-15	-57*	-40	-57
60. Patterned Turns/Total Turns	58*	12	52	28	36
61. Standardized/Standardized Plus Teacher Created Materials	61*	46	40	29	33
62. % of Instruction Given Via Demonstrations	03	25	14	13	29
63. % of Instruction Given Via Lecturing	31	03	35	21	43
64. % of Instruction Given Via Discussion	10	02	-15	-18	-56
65. % of Instruction Given Via Pupil Turns	14	10	04	-11	-19
66. % of Independent Activities Preceded by Teacher Instruc	02	06	-11	-22	-33

[1]Low inference variables coded during observations when teachers were primarily involved in group teaching. Two observers were used to establish reliability, but scores are from just one observer (an experienced teacher).

[2]Reliability data are Pearson r's for the basic categories. Variables without reliability data were constructed arithmetically from the other variables.

* $p < .10$

** $p < .05$

Appendix A

GENERAL PROCEDURE AND ORGANIZATION OF CODING

1. Fill in all the information at the top of each and every sheet.

2. Use a separate sheet for Response Opportunities for each subject. Do not draw lines - use (and label) a separate sheet.

3. Use a separate sheet for Response Opportunities and a separate sheet for Child Created Contacts (CCC) and Teacher Afforded Contacts (TAC) for reading groups. Label the sheet "Reading Group." On the CCC an TAC sheet draw a line across the entire page near the bottom to separate inside-group contacts from outside-group contacts. Outside-group contacts go below the line at the bottom of the page.

4. Transitions are to go on the same sheet as the preceding activity, but separated from the activity by a line across the entire page. Transitions must be labeled transition and one of these categories of transition designated: (1) entire class, (2) interchange between classes, (3) intraclass group changes (i.e. reading group or math group).

5. Keep an accurate record of the time. Record time at the beginning of each new activity.

6. When you fill up one section on a sheet, although the other sections may be blank, begin a new sheet for all sections.

The essential thing to remember when coding is that you must divide and label your coding so that it will be meaningful and useful later. We must be able later to match your coding by time and activity with that of your partner in order to get the most accurate picture of what went on in the classroom and in order to establish inter-coder reliability.

ACADEMIC
RESPONSE OPPORTUNITIES

The coding of response opportunities is perhaps the most difficult coding in the system, since several aspects of the interaction have to be coded and the sequence of events within the interaction must be maintained and indicated in the coding. To some extent the sequential aspects have already been designed into the coding sheet, since in going from left to right the coder takes up coding decisions in the order in which they tend to occur naturally: first, he places a "1" for a male and a "2" for a female in the column indicating the kind of question the child is responding to; then he codes the level of question; then he codes the quality of the child's answer; then he codes the teacher's feedback to the child's answer. Each of these aspects of coding response opportunities is described in turn below, after clarification concerning the term "response opportunity."

Three key aspects characterize "response opportunities" as they are defined in this system: (a) they are public interactions between the teacher and only a single child at a time, but nevertheless meant for and monitored by the entire class or by the entire group operating at the moment (such as the reading group); (b) they occur when the teacher asks a question demanding a verbal response from the child or when she asks the child to publicly respond to a question requiring a non-verbal response (such as indicating something on the board, pointing to the right letter or word, etc.); (c) only a single individual child makes the response (chorus or unison responses in which two or more children call out the answer simultaneously are not considered "response opportunities"). Thus a response opportunity involves a public attempt by an individual child to deal with a question posed by the teacher.

Other types of teacher-child interaction are not coded as "response opportunities" because they differ from the preceding definition in one or more ways. It is important for coding validity to bear in mind that "response opportunities" as used in this system are considered to be teacher afforded; it is assumed that the teacher explicitly or

at least implicitly wants the child involved in the interaction to answer the question. Response opportunities are deliberate teacher attempts to get a child to respond, or at least implicit teacher encouragement in situations where the child seeks out a response opportunity (see "call out" below). Response opportunities thus involve individual recognition of the child by the teacher. The previously mentioned situation in which two or more children call out an answer simultaneously is not considered a "response opportunity" because no individual child receives individual recognition or feedback. Even if only a single child calls out the answer, a response opportunity is coded only if the teacher responds to him in some way. Should the teacher ignore his answer altogether, it is not considered a response opportunity.

The public nature of the "response opportunity" distinguishes it from the various forms of teacher-afforded and child-created dyadic contacts (procedural, work-related, and behavioral). In the teacher-afforded and child-created work-related contacts, the teacher talks to the child about his own individual seat work. Teacher feedback here is "private," meant only for the child involved and not for the class as a whole. These contacts occur when individual children bring their work to the teacher to ask him about it or when the teacher goes around the room correcting work individually at each desk. It frequently happens that the teacher will question a child when dealing with him individually about his seat work. Such an event is coded under work-related dyadic contacts and is not considered a "response opportunity," since the question is meant only for the particular child involved and is not a public question.

Response opportunities must also be distinguished from reading and recitation turns, which are not coded in this system. The major distinction is that response opportunities are initiated by a teacher

question which requires a focal, circumscribed answer. Reading and recitation turns are more extended performances by the child, in which he responds at length to an initial question or command. Ordinarily these will involve verbal demonstration of mastery (overlearning) of skill, as when reading aloud in reading groups or reciting mathematics tables. Response opportunities involve focal questions which, along with the answer given by the child and the ensuing feedback, form a natural unit. Each such question-answer-feedback segment constitutes a self-contained interaction sequence in its own right, easily separable from preceding or following units, even when they involve the same child. Whenever the response demand on the child is such that he will continue responding until and unless he makes a mistake, the interaction is a reading or recitation turn and not a response opportunity and therefore should not be coded.

Each response opportunity which is coded requires the checking of four separate bits of information: the type of response opportunity, the level of question asked, the quality of the child's answer, and the nature of the teacher's feedback response. The last item to be coded (teacher's feedback) sometimes will be complex enough to include two or more of the categories of teacher feedback, so that some response opportunities will require five or more separate markings.

Four types of response opportunity have been identified: In the first type, the teacher names the child first and then asks her question. This column on the coding sheet is labelled (PRE); in the second type the teacher asks her question first, but she calls on a child who does not have his hand raised or a non-volunteer (NVOL). The third type of response opportunity involves the teacher's asking a question publicly but calling on a child who does have his hand raised (volunteer or VOL). The fourth type of situation is

the call out (CALL).

Response opportunities created by children who call out answers to teachers' questions without waiting for permission to respond are coded in the call out column. The teacher creates the response opportunity by asking a public question, but one child calls out an answer to this question before he has a chance to indicate that a particular child should respond. This type of response opportunity is therefore child-created, in that it was not the teacher's intent that the child answer the question. Besides those already mentioned, one additional consideration must be present before coders code a response opportunity under call out: the teacher must recognize the child's response and make some response to the child in reaction to it. Called out answers which are ignored by the teacher are not considered response opportunities and are not coded. A response opportunity coded as call out then, requires the following: (a) the teacher asks a public question; (b) the child calls out an answer to the question before the teacher has a chance to call on anyone to respond: (c) the teacher then turns his attention to the child who called out the answer and says something in response to him. The teacher's response to the child must contain feedback regarding his answer to the question; the interaction is not coded as a response opportunity under call out if the teacher confines her remarks to criticism of the child for calling out the answer. It is necessary, therefore, that the teacher make some feedback response to the child who calls out the answer.

Just as there may be confusion in distinguishing between questions directed to a non volunteer and questions directed to a volunteer when the coder is unsure whether or not the child has raised his hand, there may also be confusion in distinguishing call outs if the coder is unsure whether or not the teacher made some indication to the child that he should answer the question. There is usually little problem when the teacher calls on the children by name, but some teachers will call on children by pointing at them or otherwise non-verbally indicating that they should make a response. Coders should be particularly

alert with such teachers to pick up these less obvious cues given to children to signal their permission to respond. When the coder is not sure whether or not the teacher made such a signal, and therefore is not sure whether or not to code a question to a volunteer (VOL) or a call out (CALL), the interaction should be coded as a call out.

Similarly, when the coder is not sure whether the child selected had his hand up, VOL should be coded.

LEVEL OF QUESTION

After noting the type of response opportunity and the identity of the child involved by entering the child's number in the appropriate column, the coder now codes the level of question asked by the teacher. Level of question refers to the nature of the response demand made upon the child. Three levels are identified: process questions, product questions, and choice questions.

These three levels refer only to questions about academic or school-related content.

To determine the level of the response demand built into teacher's questions the coder must make two decisions: (a) he must decide whether the question is an academic question or a self-reference question: (b) if it is an academic question he must determine whether it is a process question, product question, or choice question. Academic questions concern factual matters connected with curriculum content of the school. They require the child to make a response showing that he has certain knowledge of information, to provide such information himself in answering the question, or to explain something at length showing his grasp of the principles involved. The content of the question deals with reading, writing, arithmetic, social studies, science, spelling, or other aspects of curriculum which the school is attempting to deliberately teach the child. Questions dealing with these matters are considered academic questions and subdivided into process, product, and choice questions. Questions that do not deal with such factual matters but instead ask for the child's preferences, personal experiences, and so forth are tallied in the boxes under Self-Reference questions. Questions which deal with a child's opinions or predictions are coded separately as Opinion Questions. Both the Self-Reference and Opinion categories will be described later.

Process Questions

This is the most complex level of question, in which the child is required to explain something in a way that requires him to integrate facts or to show knowledge of their interrelationships. It most frequently is a "why?" or "how?" question, and usually requires an extended phrase or sentence for formulating an adequate response -- single word answers are not usually sufficient. A process question requires the child to specify the cognitive and/or behavioral steps that must be gone through in order to solve a problem or come up with an answer.

Examples: What can we learn from this story?
What does that saying mean?
Why should we not play with matches?
How do new plants grow from old ones?
Why does it get dark at night?
How do you know that that's a long "e" sound?
Why is that a wrong answer?
What should you do if . . . ?

As always, the teacher's intent determines the coding. For example, the teacher may ask "When you ride your bike and come to a stop sign, what do you do?" Ordinarily this would be coded as a product question demanding the answer "Stop." However, if the question appears just after a lesson in which the teacher had explained the process of stopping (stop the bike, carefully look right and left, judge the distance of any cars in sight, and quickly get to the other side, etc.), this question would be coded as a process question. This example illustrates the procedure to be followed when in doubt in determining whether a question should be process versus product. If the teacher seems to be requiring a process answer, that is a long explanation of a complex sequence of events, process question should be coded. If on the other hand he seems to be satisfied with a simple short answer, product question would be coded.

Product Questions

Product questions seek a specific correct answer which can be expressed in a single word or short phrase. They do not involve the explanations built into process questions, and at the same time they do not provide the child with alternatives which include the correct answer, as in choice questions. Thus the child must either know the answer and verbalize it or take a guess by encoding an answer on his own.

Examples: What (letter, number, day, shape, color, etc.) is this?
Who (discovered America, is the president)?
What is this?
When (is Christmas, was America discovered, etc)?
Where (is Boston, do we buy food, etc.)?
What do we get from cows?
How many _____ are there?
How do you spell _____?
What do buses do?
What is this word? (a question requiring the child to read a single word is coded as a product question rather than as a reading turn, which involves reading at length)

Product questions usually begin with "who?", "what?", "when?", "where?", "how much?", or "how many?". Many of the response opportunities in the early school grades will be coded as product questions if the child is asked to identify a letter, produce a sum or remainder, etc. While the child may have to go through many cognitive processes in order to arrive at the answer, the question itself as asked does not require him to verbalize these processes but only to produce the answer. So long as this is true the question is a product question, and the response demand on the child is less than it is for a process question, since less is required of the child and since the possibility remains that he might guess the answer without knowing the process that the teacher wants him to know.

The following example occurred during a reading group: The teacher gave each child a card with a word on it and then told the children, each in turn, to read their word and then place it under the picture that it matched. This was coded as two separate response opportunities for each child; the first one being a product question (read the word), and the second being a choice question (match the word to one of the pictures).

In discussing stories or pictures there sometimes will be difficulty in distinguishing product questions from self-reference questions. As always, coding must follow the teacher's apparent intent. Thus if the answer to the question is to be found by examining the picture (What color is Sally's wagon?), the question is coded as a product question. On the other hand, if the teacher is not asking for a factual answer but wants to get opinions on what the children think might happen (What's Dick going to do now?), an opinion question is coded. In general, if the teacher is fishing for the right answer he is asking a product question; if he is instead only trying to get the children to express Themselves or to talk about the picture, self-reference or opinion are coded. Sometimes the teacher will begin with a product question and, seeing that he isn't going to get the answer, will continue to ask various children what they think will happen, etc., so that the remainder of the questions will be coded as self-reference or opinion questions.

Choice Questions

In the choice question the child does not have to produce a substantive response but may instead simply choose one of two or more implied or expressed alternatives. Included are yes-no questions, either-or questions, and questions which present more than two alternatives but which make it clear that the correct answer is one of the alternatives presented. Choice questions are of interest because they tend to encourage guessing by maximizing the child's chances of producing correct answers (response products), even though he may lack the correct knowledge or skill (response process) that the teacher assumes to be operating when children answer correctly. Choice questions involve a more limited response demand upon the child than do product questions, since unlike the latter they do not require the child to produce a substantive response on his own; the child knows that the correct answer is one of the alternatives the teacher presents in asking the question, and if he is disposed to guess he can make a response by indicating one of those alternatives. Occasionally a large number of alternatives will be present, as when the teacher asks the child to indicate or underline one particular letter of the alphabet (out of the 26). This nevertheless is still coded as a choice question because the child knows that the correct answer is one of the alternatives presented. When the alternatives are presented verbally, there are usually only two or three alternative categories of response.

Two criteria distinguish choice questions: (a) the question deals with academic content and cannot be classed as a self-reference question; (b) the teacher provides response alternatives, either verbally or by showing the child visual aids to look at in connection with the question, which include the correct answer among them (ie., the correct answer is one of the alternatives presented). Examples:

Is this (b or d, 3 or 4, Monday or Tuesday, a square or a circle, red or blue)? (either-or questions)

Which of these is (taller, smaller, blue, a vowel, the same as this one, etc.)? (select the right answer from among the alternatives presented)

Are these (the same, blue, circles, synonyms, correct, etc.)? (Yes-no questions)

Which four of these five things go together? (the child must pick four pictures but nevertheless the correct answers are provided in the alternatives shown)

The big bear sat on a brown box. Which words start with the same letter? (although more difficult, this is still a choice question in that the alternatives are provided in the question itself)

Look at the color words on the black board. Which ones start with the letter "b"? (Again, the correct answers are included in the alternatives presented. If instead the children were expected to pull these from memory (What color words start with the letter "b"?) without any reference to concrete examples of color words, the question would be coded as a product question.)

Make an X on all the animals that have a tail. (Any workbook or worksheet exercise which involves marking one or more of a set of alternatives according to some rule is treated as a choice question, since all the alternatives are provided.)

Coders should bear in mind that any question which is an either-or question or a yes-no question is coded as a choice question, regardless of the complexity of the content. Examples:

If I pour the water from this white dish into this test tube, will there be more water, less water, or just the same amount?

Are the lines of a rectangle equal and parallel, equal but not parallel, or parallel but not equal?

Which is better to put out a grease fire -- water or sand?

Although the preceding examples are apparently complex, it nevertheless remains possible for some children who do not understand the processes involved to be able to respond to the question, since the response alternatives are provided in the question itself. Thus should the child decide to respond rather than say that he doesn't know or ask for more information, he can respond by verbalizing one of the response alternatives back to the teacher.

Sometimes a question which would ordinarily be classified as a product question is coded as a choice question because of the immediately preceding events. The previous example "What color words start with 'b'?", for instance would be classified as a choice question if the teacher had preceded it by calling the children's attention to concrete examples of color words (by writing them on the board, showing visual aid materials on which the color words were printed). Another example occurred in the science lesson in which the teacher gave an extended presentation about how leaves could be classified according to size, shape, and color. She repeatedly compared pairs of leaves explaining that she was looking for similarities and differences in size, shape, and color. The repetitive nature of her presentation and the restriction of her language to the key words "size," "shape," and "color" led eventually to the isolation of these three words as a restricted set of alternatives to respond to the question "How are these two leaves different?" When she later began asking the children to compare leaves her questions were coded as choice questions, since she had identified and reinforced "size," "shape," and "color" as the response

alternatives she had in mind and because she accepted with apparent satisfaction the responses of children who simply verbalized one of these key words without any additional material.

CHILD'S ANSWER

After coding the child's identity, the type of question, and the level of question, the coder notes the child's answer into one of four categories: correct, partially correct, incorrect, or no response. The teacher's intent is taken into account in determining the correctness of the child's response. Frequently teachers may ask ambiguous questions which are answered correctly or partially correctly from one point of view but which are treated as incorrect by the teacher, who was looking for a very specific answer. Thus it is the teacher's perception of the correctness of the child's response which is coded, not the coder's perception. This distinction is important because the next variable coded is the teacher's feedback to the child's response, and this feedback is considered to be feedback to the child's answer as perceived by the teacher. Consequently if the teacher reacts to a response as if it is wrong it is coded as wrong, even though another observer might consider it to be partially or even completely correct.

Correct Answers

If the child answers the teacher's question in a way that satisfies him, the answer is coded as correct. Determination of whether or not the teacher is satisfied with the child's answer does not necessarily require that the teacher positively affirm the answer or make some favorable response to it. Instead, the child's answer should be considered correct unless the teacher makes some positive action suggesting dissatisfaction with it (explicitly explaining that the child's answer is incorrect or only partially correct, giving the "correct" answer, or asking someone else to answer the same question). If the teacher does not make an attempt to improve upon or replace the child's answer with another, his answer is considered correct. This means that some answers that the coder would not accept but which the teacher treats as correct are to be coded as correct answers.

Part-Correct Answers

Part-correct answers are answers which are correct but incomplete as far as they go or answers which are correct from one point of view

but not the answer that the teacher is looking for. Again, the teacher's feedback response may determine the way the answer is coded. If the teacher indicates that the child's response is correct but incomplete, or if he indicates that the response is correct or defensible but not the answer that he is looking for, code the response as part-correct.

1. An answer is coded as part correct whenever the teacher indicates ambivalence about the response. This means that the teacher may accept the response as correct as far as it goes but note that it is incomplete (as when the child gives only one part of a two part answer); another type occurs when the child's answer is more specific or more general than the particular one that the teacher had in mind, so that the teacher must indicate both the validity and the imprecision of the child's answer ("Well, it is an animal, but what kind of an animal is it exactly?"). Part correct answers will be coded most frequently when the child produces an answer that the teacher had not anticipated. Often this will be because the teacher's question was more ambiguous than the teacher realized when asking it.

2. Sometimes the child will make an answer that is correct in content but is not presented in a form which satisfies the teacher. Examples include shaking the head to indicate "yes" or "no" rather than responding verbally, answering the question in a word or a phrase when the teacher wants it put into a complete sentence, counting on the fingers when the teacher wants the child to do the problem in his mind, etc. These answers are also coded as part correct, since the teacher accepts the correctness of the content but criticizes the form.

Incorrect Answers

Responses coded as incorrect answers are those in which the child's response is treated as simply wrong by the teacher. The teacher need not explicitly tell the child that he is wrong; he may indicate this indirectly by searching for the answer from someone else or by providing it himself. In one of these ways the teacher indicates that the child's answer is not an acceptable response to the question he has asked.

Don't Know

Mumbling which does not appear to be an attempt to answer the question, as when the child seems to be talking to himself or perhaps membling "I don't know," would be coded as don't know, (DK).

This category is included in the coding system specifically for those instances when the child clearly does not answer the question which the teacher puts to him, and, in effect, says so, or makes some verbal response indicating this.

No response is coded whenever the child remains silent. If the child does make an intelligible response to the question it must be coded as correct part correct, or incorrect. Thus if a child mumbles an answer to a teacher's question and is asked by the teacher to repeat his answer more loudly, the answer will be coded as either part correct or incorrect, depending on the reason the teacher asked the child to repeat the question. If the teacher wants the child to repeat because she has heard his response but wants the other children to hear it or wants to avoid allowing children to mumble responses, the child's answer is coded as part correct, in that it is acceptable content delivered in unacceptable form. On the other hand, if the teacher is asking the child to repeat because the teacher has been unable to hear the child's answer and does not know whether it is correct or incorrect, the child's answer is coded as incorrect. Any mumbled answer which apparently is an attempt to answer the question is treated an incorrect as long as it remains unintelligible.

To summarize: if the child attempts to answer the teacher's question, his answer is coded as correct, part correct, or incorrect, depending on the teacher's reaction to it; if he indicates that he is unable to answer, it is coded as don't know (DK) or if he does not attempt to answer the question, it is coded as no response (NR).

SYMBOL	FEEDBACK REACTION
++	Praise (positive evaluation)
--	Criticism (negative evaluation)
0	No feedback response -- teacher does not react to child's answer
Pcss	Process feedback
Giv Ans	Gives correct answer (without getting into process)
Ask Oth	Asks another child to give the answer
Call	Call Out (some other child calls out the answer before the first child responds to the question)
Rept	The teacher repeats the question
Reph or Clue	Teacher rephrases the question or gives a clue
New Q	Teacher asks a new question

The first seven of the ten categories listed above are designated as "terminal" feedback, while the last three are called "sustaining" feedback. This is one of the key distinctions involved in studying communication of teacher expectations. The categories of sustaining feedback include teacher behavior which prolongs the response opportunity by providing a second chance to deal with the same or related questions. Use of sustaining feedback reactions is an index of the teacher's willingness to stick with the child until he can produce an acceptable answer. Terminal feedback, on the other hand, brings the response opportunity to a close. With terminal feedback reactions the teacher either gives the child the answer or sees that he gets it from someone else, or merely makes a feedback or evaluation response without supplying the answer. In either case, he does not sustain the interaction and provide additional response opportunities.

The terminal feedback categories may also be profitably subdivided for some purposes to the first three categories, which do not involve a substantive response or answer, and the second four categories, which do involve such an answer. The ten categories, then, may be summarized as follows: the first three categories of terminal

feedback provide the child only with positive or negative evaluation, or no feedback, and not with substantive information; the last four categories of terminal feedback do provide substantive information to the child, either from the teacher or from one of the other children; the final three categories (sustaining feedback) provide the child with a second response opportunity, either to answer the same question or to answer a related one. The categories are defined so as to be mutually exclusive but not contradictory, so that more than one category may apply to a given teacher feedback reaction. In such cases, each new category of teacher feedback is simply noted in the order in which it occurs. Certain types of multiple-category teacher feedback reactions require special coding conventions, but discussion of these will be deferred until the categories themselves are presented in more detail.

Praise

Praise refers to the teacher's evaluative reactions which go beyond the level of simple affirmation or positive feedback by verbally complimenting the child ("Good," "Fine," "Wonderful," etc.) and/or by accompanying verbalization of positive feedback with expressions or gestures connoting excitement or warmth. Thus praise is coded when the teacher does something more than merely indicate that the child has given a correct response. He communicates a positive evaluation or a warm personal reaction to the child and not merely an impersonal communication of information.

Criticism

Criticism parallels praise in that it refers to negative teacher evaluative reactions that go beyond the level of simple negation by expressing anger or personal criticism of the child in addition to indicating the incorrectness of his response. The category includes obvious verbal criticism ("That's a stupid answer," "What's the matter with you?" "If you'd pay attention, maybe you'd get it right") and verbal negation which is accompanied by expressive or gestural communication of hostility, anger, disgust, or sheer frustration. In general, any verbal response which disparagingly refers to the child's intellectual ability or, more frequently, his motivation to do good work, is coded as criticism. Statements of latter type by the teacher may

be factually true (i.e., the child may not have been paying attention) or may be unverifiable gratuitous rejection ("You just don't care"). Both are nevertheless coded as criticism, since this coding refers to the teacher's behavior per se and not to the veracity or justification for his statements.

No Feedback Reaction

If the teacher makes no response whatever following the child's answer to the question, he is coded for no feedback reaction. This means that he makes no verbal response to the child and does not communicate affirmation or negation by shaking his head in response to the answer. Instead, he merely moves on to something else, perhaps by starting to make a new point or by asking another child a question. Most coders will be surprised to find that this category is used much more often than they had expected. It frequently happens that the teacher makes no feedback reaction at all to the child's answer, especially in fast-moving question drills where he is pushing to get correct answers in an impersonal fashion, without paying attention to the individual child giving the answer.

In addition to the obvious condition of no feedback reaction outlined above, where the teacher says and does nothing in reaction to the child, one special type of teacher reaction is also coded in this category. This occurs when the teacher repeats the child's answer in a quizzical manner without indicating whether he considers it to be correct or incorrect. This reaction may frequently occur when the teacher is asking the children to guess, give opinions, or make predictions about something. In such instances he may reply to the child's answer ("He's going to go home and tell his mother") with an ambiguous response ("You think he'll go home and tell his mother?"). Unless the teacher's feedback reaction is further elaborated to provide affirmation or negation or some substantive answer to the child, it is coded as no feedback reaction.

Process Feedback

The process versus product distinction introduced previously in discussing level of question is also used in coding the level of teacher feedback. Process feedback is coded in the present category,

while the following three categories refer to product feedback (simply giving the answer). Process feedback is coded when the teacher goes beyond merely providing the right answer and discusses the cognitive or behavioral processes that are to be gone through in arriving at the answer. In other words, he reviews the question or problem with the child at length, telling him how to go about responding to it and not merely what the correct answer is. Process feedback occurs most frequently following errors, when the teacher explains the reasoning processes to be gone through to arrive at the correct answer or explains the erroneous processes followed by the child to arrive at the wrong answer. Process feedback may sometimes follow correct answers, as when the teacher elaborates on the response to verbalize the process knowledge it represents ("Yes, we know that we should use a capital letter since it is a proper name, and all proper names begin with capital letters"). Teachers may provide process feedback by simply answering a process question, since by definition a process question requires a process answer. Other than this special situation, however, process feedback will usually require elaboration upon the answer to a question.

Gives Answer

This category is used when the teacher gives the child the answer to the question, but does not elaborate sufficiently to be coded for process feedback. The category is used only when the child has given a wrong answer or has not answered the question. When the teacher gives an answer to a process question it is coded as process feedback. Otherwise, any situation in which the teacher provides the answer to the question to which he has asked is coded as gives answer. Usually this will correspond to product feedback following product questions, although occasionally giving the answer to choice questions may also be coded here if the child does not take a guess and try to answer the question himself.

Asks Other

If the teacher does not answer the question himself but instead asks some other child to answer it, the feedback is coded as asks other. This category is coded regardless of the level of question or feedback involved (i.e., feedback to process questions is still coded under asks other if the teacher asks another child to provide the answer). Sometimes the teacher will ask another child very explicitly to answer the question that could not be handled by the first ("Johnny, can you help Mary?"). However, this need not be so explicitly stated for asks other to be coded. Whenever the child does not answer a teacher question and the teacher moves to another child in order to get the answer to that same question, the teacher's feedback reaction is coded for asks other.

Call Out

The call out category is used when another child calls out the answer to the question before the teacher has a chance to act on his own. This category is coded regardless of the level of question asked: if another child calls out the answer to the teacher's question before either the first child or the teacher himself can provide that answer, the feedback category call out is coded. Usually this will mean also coding a response opportunity for the child who called out the answer, provided that the teacher makes some individual response after he calls out the answer. In any case, the feedback coded for the first child is call out.

Repeats Question

This category and the two to follow comprise the categories of sustaining feedback, in which the teacher sustains the response opportunity and provides the child with a second chance to respond. The first such reaction is when the teacher simply repeats the question. This will almost always occur when the child has made no response, although it may also occur at times in which he has given an incorrect response. In any case, if the teacher asks a question, waits some time without getting the correct answer, and then repeats the question

to the same child, his feedback reaction is coded as repeats question. The teacher need not repeat the entire question word for word in order to be coded in this category. Truncated versions of the original question and short probes to determine if the child can make any response to the original question, are both coded as repeats question. For example, to the original question "What color is this?" the following responses are all coded as repeats question: "What color?" "Well?" "Do you know?" "John?" (The latter said in a manner that communicates that the teacher is waiting for the child to respond to his original question).

In each of the variants mentioned above, the teacher is communicating that he is waiting for the child to respond to the original question and that he still wants him to respond if he can. The teacher does not change the question, as in the following categories, but merely repeats it or refers to it as it was asked previously.

Rephrase or Clue

In this feedback reaction, the teacher sustains the response opportunity by rephrasing the question or giving the child a clue as to how to respond to it. Usually the rephrasing of the question in this situation will be such as to simplify it, particularly in moving from a product question ("What color is this?") to a choice question ("Is it red or blue?"). Rather than rephrase the question in this manner, the teacher may provide a clue expressed as a declarative statement: "It's the same color as an apple." Two key considerations determine the coding of rephrase or clue in teacher feedback: (a) the teacher does not merely repeat the question as originally asked but embellishes it in some way to make it easier for the child to respond; (b) nevertheless, he is still seeking the same response as asked for in the original question. The latter condition separates the present category from the category of new questions which follows, in which the teacher asks a new question which requires a different answer from the one asked originally.

The material provided by the teacher in rephrasing the question or giving a clue may or may not be helpful for the child -- certain types of clues may actually confuse him rather than help him. This fact should not be allowed to influence the coding. So long as the teacher does something which is intended by the teacher to help the child answer the original question, the teacher's action is coded as rephrase or clue.

New Question

The teacher asks a new question when she requires an answer that is different from the original question, although it may be closely related. A question requiring a new answer is coded as a new question. This is the only criterion. Thus to the original question "What color is this?", questions which elicit the same answer ("Is it red or blue?" "Is it red?") are coded as rephrase or clue. Questions which seek to elicit a different answer are coded as new questions ("Well, what color is this one?" "Have you been studying your homework?" "Is it bright or a dull color?").

The occurrence of sustaining feedback (repeats question, rephrase or clue, or new question) presents a special coding problem because this type of feedback gives the child a new response opportunity. This new response opportunity must then be coded for level of question, quality of answer, and additional feedback from the teacher. At the same time, the fact that it is a follow up to an original response opportunity rather than a wholly new response opportunity must be maintained in the coding system. This is accomplished by skipping down to the next row whenever sustaining feedback is coded, thereby bringing a close to the coding of the original response opportunity and beginning the coding for the follow up response opportunity. On the next row the level of question, the quality of the child's answer, and the nature of the teacher's further feedback is coded. Follow-up response opportunities occurring due to sustaining feedback in reaction to the original response opportunities are coded for type of response opportunity, which would be coded non-volunteer (NVOL) in all cases of sustaining feedback, level of question, quality of child's answer, and type of teacher feedback.

Other than the special conditions requiring skipping to a new row when sustaining feedback occurs, the coding of teacher's feedback reaction simply involves noting the appearance of new codable feedback categories

Note also that two or more occurrences of the same type of sustaining feedback (repeats question, rephrase or clue, or new question) may occur in succession and be coded separately. Thus a teacher might repeat the original question (or make some attempt to get the child to answer it) two or three times rather than just once. In such a situation, each repetition of the original question is coded, so long as there is some time in between which amounts to a new response opportunity being extended to the child. However, redundant repetition of the question ("Well -- do you know?") is coded as only a single repetition since no time for an opportunity to respond is allowed between parts of the question. When such time is allowed ("Well? . . . Do you know?"), two separate repetitions of the question are coded.

APPENDIX:

Examples of Teacher's Feedback Reactions

To facilitate comparison of examples of teacher feedback reactions to the answers of the children, examples will be given with reference to three typical teacher questions and child answers. The three situations are as follows:

Question one: What color is this? (the correct answer is "Red")

Question two: What word is this? (the word is "Bad") This question might be asked as stated or might be implied during the reading group, as when a child is reading but gets stuck when encountering the word "bad".

Question three: How do you think John feels? (the answer is "Bad" or any one of its synonyms)

Examples of teacher feedback reactions which might be made to the child's answers (or failures to answer) to the previous questions are presented below. Under each heading the feedback reactions following the number 1 refer to reactions to question one; those following the number 2 refer to reactions to question two; and those following the number 3 refer to the reactions to question three. Additional material and discussion of special situations will appear after the examples for each of the twelve categories of teacher's feedback reactions.

<u>Praise</u>

1. "Red!" (delivered with gusto and warmth)
   "Right -- it's red. Good, Johnny."
   "Good." (said in response to a child who has given the correct answer)
   "Yes, you really know your colors, don't you!"

2. "Good -- you remembered didn't you!"
   "Bad! Very good, Johnny."
   "Right -- you figured that out all by yourself, didn't you!"

3. "Yes, I think you're right, Johnny, that's good thinking."
   "Right, Mary! You read the story and found out how Johnny felt, didn't you?"

<u>Criticism</u>

Teacher feedback reactions coded as criticism include negation accompanied by gestural or expressive communication of anger, rejection, or frustration as well as direct verbal criticism:

"Maybe you'd know if you'd pay attention."
"You wouldn't make mistakes like that if you tried harder."
"Don't guess -- look at the word. You should know better than that."
"I told you to raise your hand before answering -- weren't you listening?"
"We've been over this three times already, John -- you should know it by now."
"That's not right -- what's the matter with you?"

No Feedback Reaction

The teacher is coded for no feedback reaction if he simply does not respond to the child following his answer of if he makes a verbal response which does not communicate information about the correctness or incorrectness of the child's answer. Examples of the latter: "You think it's red;" "I never thought of that."

Process Feedback

1. Process feedback is not possible in reaction to the child's answer to the first question, since the question deals with the arbitrary linguistic label which the English language attaches to the color "red." These and equivalent questions involve basic facts which must be simply memorized rather than explained. Since the correctness of the correct answer resides in arbitrary societal consensual agreement rather than in the presence of a logically based sequence or process, no process feedback is possible. In addition to color labels, other categories of questions which do not admit of process feedback include spelling, traffic signs and turn signals, and the interrelationships among units in systems of measurement. Thus process feedback could be given to a child when the question involves telling time from the clock, but not when the question concerns the number of minutes per hour or the number of hours per day.

2. Johnny, in order to read the word you have to sound it out (followed by a demonstration of how to sound out the word). When you don't know the word you can sometimes figure it out by thinking about the story so far and by looking at the picture (followed by an extended explanation of how the child might have figured out the word was "bad" by figuring out that Johnny felt bad in the story and that the particular sentence was describing how Johnny felt).

3. To figure out how Johnny feels you have to think about the story and about what happens to him (followed by a discussion of significant events in the story which would suggest that Johnny feels "bad").

Gives Answer

1. It's red. We call this color red. It's red, just like a stop light.
2. Bad. The word is bad. B-A-D spells bad. Not bed -- bad.
3. I think John probably feels bad. He doesn't feel very good, does he? He is very unhappy. (assuming the teacher equates this with "bad") He feels awful.

Asks Other

Here the teacher does not provide the answer for the child but instead asks for someone else to provide it:

Does anyone know?
Mary, can you tell me?
Can someone help John?
What is it, class? (the teacher may call for a chorus response rather than ask for a single child to respond)

Call Out

Call out is sometimes coded for the teacher's feedback reaction (although it is not a teacher response) if some other child calls out the correct answer when the first child gives an incorrect answer or is unable to respond. This includes both instances in which the child who calls out the answer is coded for response opportunity (because the teacher then turns his attention to him and makes a feedback response) and instances in which the child who calls out the answer does not get coded for a response opportunity (the teacher does not turn his attention to him and give specific individual feedback). Thus call out has a slightly different meaning for purposes of coding teacher feedback reaction than it does for coding response opportunities for individual children. Call out is coded in teacher's feedback reaction whenever the child gets feedback from another child who in fact calls out the answer; it is not necessary that the teacher give feedback to the child who called out the answer.

Repeats Question

1. What color? Well? Do you know?
2. Do you know that word? Are you stuck? What is it?
3. How does he feel? What do you think? Hmmmm?

Rephrase or Clue

1. Is it red or blue? Is it red? Is it blue? It's the same color as a stop light. It's our new color for today. It begins with "r". It rhymes with "bed".

2. Is it bad? Is it had or bad? Does he feel good or bad? Look at the first letter. What word does it rhyme with? We just had this word up here (pointing). How does Johnny feel? He feels _____?

3. Does he feel good or bad? Does he feel bad? Well, is he happy, sad, angry, or what? Look at his face. He's never going to see Sam again. How would you feel if you were Johnny? How does he look?

New Question

1. Yes, and what color is this? What else is red? Are you wearing anything that's this color?

2. Why did he feel bad? Is he crying? Did you study this story? How do you spell that word?

3. And how does Sam feel? Yes, how could you tell that he was sad? Then what happens? Why does he feel sad?

In general, the teacher's feedback to the child is coded as process feedback if he explains why an answer is wrong or if he explains what to do in order to get the right answer. If the original question was a process question, the teacher will be giving process feedback simply by giving the answer to that question. This includes the extreme case in which the child has answered the question correctly and the teacher responds merely by repeating the child's process answer. Except for the special case of process questions, however, the teacher must go beyond simply giving the answer to the original question in order to get credit for process feedback. For example, the teacher may be observing a child writing his name on the board. If she merely says "No, Johnny, you put a little 'j', your name begins with a capital 'J'." she would be coded for product feedback. However, if the teacher explained about names being proper nouns and proper nouns always being identified with an initial capital letter, she would be coded for process feedback.

The teacher may sometimes be credited with process feedback when this feedback is apparently not understood and therefore not successful.

The key consideration, however, is an attempt to communicate to the child why his response was wrong and to help him understand the processes involved, and not necessarily the child's success in reaching this understanding. Consider the following example:

Teacher: What color of clothes should you wear when riding a bike at night?

Child: Red, or maybe white.

Teacher: Don't you think you might want to wear white so that you could be seen better?

The teacher in this feedback reaction attempts to communicate the rationale underlying the choice of white as the appropriate color. This may or may not be understood by the child. The teacher is nevertheless credited with process feedback because of his attempt to delineate the rationale.

Differentiation among repeating the question, rephrasing the question, and asking a new question requires consideration of both the teacher's apparent intent and the response demand of the second question. For instance, when a child is reading and stops because he apparently does not know the next word, the teacher reaction "Are you stuck?" can be seen as functionally equivalent to "Do you know the word?" and therefore codable as repeat. However, the reaction "Did you study this?" is different. Here the teacher is not merely inquiring about whether the child knows the word or wishes to make a guess. He has shifted focus to the more general matter of the child's reading ability and faithfulness in practicing it. Consequently, this reaction is coded as a new question, since it demands a new response and is not an attempt to get the child to produce the word. The teacher reaction "How does Johnny feel?" would be coded as repeat with with reference to question three of the examples. However, its appearance in connection with question two, when the child was stuck when trying to read the word "bad", would be coded as providing a clue (attempting to help the child guess the word by using context clues).

STUDENT INITIATED QUESTIONS

This category is used to cover a public response opportunity that is initiated by the student rather than the teacher. Included are situations in which the student raises his hand and asks the teacher a question regarding the matter under discussion or some other matter. These are similar to other response opportunities in that they are dyadic teacher-child interactions which are public and monitored by the rest of the class. However they are not introduced by the teacher and do not involve the child answering a question posed by the teacher. These codings are tabulated separately later in order to keep them separated from the normal type of response opportunity in which the student answers the teacher posed question.

The student may raise his hand requesting permission to talk, or he may call out his question without permission. If the child calls out, check the CALL column. If he is given permission to speak, then leave this column blank.

Relevant (REL) is coded if the question has to do with the topic under discussion at the time, or if the question has to do with procedures for accomplishing the assignment or activity which is going on at the moment. For example, if the class is preparing to do a math assignment, a question about the number of problems to do; the procedure for working a particular problem; or the time that the assignment is due, would be relevant.

Irrelevant questions would be any which were not about the current topic. If the class was doing a math assignment and a child asked what time school dismissed for the day, the question would be coded as irrelevant (IREL).

Praise(+) and criticism (−) columns are reserved for coding the teacher's

positive or negative evaluation of the student's question. An example of Praise would be "That's a good question, I'm glad you asked that." Criticism would be coded if the teacher responded "That's a stupid question. You didn't think that through."

Simple "yes" and "no" answers would not be coded in these columns. They should be used only for noting the teacher's evaluation of the content of the child's question, not his behavior in asking it. For example, she might praise his question, in which case the praise (+) column would be checked, but she might warn him not to call out. This warning should be coded in the behavioral warning column.

The next set of columns provide for recording the type of teacher feedback. No feedback (0) is coded if she ignores the question and gives no response to the child. The teacher may delay her answer to the child because she is doing something else or because she will be answering it in a few moments when she is giving directions for doing homework, etc. She may ask him to hold his question for later or she may say, "I'll answer you when I'm through talking to Joe."

When she does respond to the question she may not accept (NACPT) it into the discussion, or otherwise refuse to entertain it. The teacher might say, "We aren't talking about that now" or "Let's stick to the subject."

Her response may be brief using a few words or a short phrase.

S: What page are we on?

T: Page 6.

A long feedback response from the teacher would involve a more detailed answer such as:

S: What page are we on?

T: Remember, we did the division problems on page 5 yesterday, so today we are going on to page 6 for practice.

In the case of a redirect, the teacher does not answer the question herself, but directs it to another student or to the whole class. She might say, "Can anyone answer Johnny?" or "Tell him, class."

The behavioral categories are used primarily for coding those instances when the teacher focuses on the child's actions in questioning. These are chiefly disciplinary situations where the child has violated some rule. Examples: The teacher may entertain the question, but reject the behavior. She could also praise the behavior.

Praise: "I like the way Sam got permission before he talked."

Criticism: "I just told you the answer to that. If you had been paying attention you would know!"

Warning: "Next time raise your hand and get permission to talk."

STUDENT INITIATED COMMENTS

Student initiated comments are treated in somewhat the same way as student initiated questions. However, since these contributions are comments and not questions which require specific answers from the teacher, teacher's answers will be coded differently. Comments may be coded as to whether or not they are called out without permission and whether they are relevant or irrelevant to the topic under discussion at the time as in the case of student initiated questions.

The teacher may praise ($\overset{+}{+}$) the content of the student's contribution by saying, "That's a good point. We should talk about that." She may criticize (=) by saying "That's not a good idea." and thereby negatively evaluate the student's comment.

The teacher may give no feedback (O) at all to the child's comment. This situation could occur if the child calls out a comment and the teacher does not

respond to it. She may delay her answer to the comment by saying, "We'll get to that later." The teacher may also not accept (NACPT) by listening to his contribution but telling him to stick to the subject or rejecting his suggestion by saying, "We don't need that now."

The teacher may also accept (ACPT) his comment with a nod, an "OK" or a "yes" or in some other unevaluative way and then turn her attention to someone else. In that case the (ACPT) column is coded.

The integrate column is checked (INTEG) is the teacher takes the child's comment and incorporates it into the class discussion. This could happen if for example, the class is listing something like "Rules for Good Health". If the child names a good rule and the teacher puts it on the board, the coder would code an (INTEG).

Shift is coded if the child's comment or contribution changes the direction of the class discussion. The teacher may take up the contribution and move the discussion along lines dictated by the child's point.

The behavioral categories are coded for comments in the same way as they are coded for student initiated questions. The teacher may accept and even praise the comment, but warn or criticise the child about calling out without permission, or about staying in his seat.

The coder must be careful not to code as student initiated comments a child's answer to a question the teacher asked previously. For example:

Teacher: What is this shape? George?

George: It's a triangle.

Sam: That's not a triangle. A triangle has three sides.

Judy: It's a square.

Teacher: Right, a square.

Sam's statement is a student initiated comment since it is not an answer to a question asked by the teacher, but is merely a comment. Judy's statement is an answer to the teacher's question, however, and is therefore coded as a response opportunity rather than a student initiated comment.

SELF REFERENCE QUESTIONS

The self reference question requires the child to make some non-academic contribution to the classroom discussion. Any questions which do not involve academic content and/or are not intended to elicit a particular correct factual answer are tallied as self-reference questions. Such questions do not have objectively verifiable right or wrong answers. Instead they ask the child for his personal experiences, preferences, home life or other factors in his personal background.

Examples:

Do you have a(dog, car,cold, pencil,)?
When is your birthday?
Do you like (arithmetic, ice cream, this story,)?
What are you doing?
Have you ever seen (a football game, the inside of a space capsule)?
Do you understand the work?
Did you do your homework?

The coder must determine whether or not the question is subject-matter related, that is, whether the question is somehow related to the subject at hand. For example, the teacher might begin the introduction of a new unit on agriculture with the self question, "Have you ever planted a garden?" A second coding decision must be made once subject-matter-related vs. non subject-matter-related is determined. and that is whether the question is a request for the child to show a preference or to give information about his past experience. Once these distinctions are made a hash mark is placed in the appropriate box. If the coder cannot decide between subject-matter related and non-subject-matter related, then one tally will go in the column marked (?).

OPINION QUESTIONS

Opinion questions occur frequently when the teacher starts a discussion on some topic. The teacher's purpose is usually to get a discussion going, and her responses to the children are conditioned more by this general aim than by a concern for the correctness or incorrectness of a given opinion. Opinion questions require the student to take a position on an issue or to predict the outcome of an experiment or hypothetical situation. It assumes that the child's opinion stems from an articulated rationale rather than from some chance whim. If pressed he could give reasons as to why he formed it. This type of question is usually when the teacher is trying to introduce a new unit of study.

In contrast, the preference type of self-reference question previously discussed merely asks the child to express a preference or choose among alternatives on the basis of taste. The question is not as centrally related to curriculum goals as the opinion question, and the child does not have to go through an articulated thinking process in order to answer it.

A few examples of opinion questions would include the following:

What would you do in that situation?

Do you think there should be a law limiting the number of children people have?

Do you think that people will be living on the moon in the year 2000?

The (NR) No Response column is checked only if the child makes no response when asked an opinion question. A response can be verbal or non-verbal. The coder may hear or see a child respond, but if the response is not perceived by the teacher, it is coded as a No Response (NR).

The Praise (+) column should be coded if the teacher offers some positive evaluation of the content of the child's answer to the opinion question. She might Praise by saying, "That's good. I hadn't thought of that." It is also possible for the teacher to Criticize (−) the child's response or offer

ome negative evaluation of the child's response which goes beyond mere disagreement.

Teacher's feedback, aside from Praise or Criticism, may also be coded in the following ways as well. She may Ignore (O) the child entirely by turning her attention away, responding to another child, or otherwise give no feedback of any kind.

The Disagree column is coded if the teacher has heard the child, but indicates that she does not accept what he has said. She may Disagree by saying, "Oh, I wouldn't do that." "I wouldn't like that." or by offering a counter opinion.

The teacher may also Accept (ACPT) what the child says in some non-commital way by saying "I see.", "OK", or by nodding and indicating that she has heard and registered the child's answer.

Integrates should be checked if the teacher takes the child's opinion and weaves it into the ongoing discussion or uses it in any way to build on.

Example:

> "Bill says that we don't know enough to have people living on the moon. This may be true, but what about in the year 2000?"

DYADIC TEACHER-CHILD CONTACTS

Dyadic teacher-child contacts differ from response opportunities and reading and recitation turns in that the teacher is dealing privately with one child about matters idiosyncratic to him rather than publicly about material meant for the group or class as a whole. The latter distinction is the key one, since teacher-child dyadic contacts are not always private (the teacher may talk in a loud voice or address the child from across the room). Such interactions are nevertheless coded as teacher-child dyadic contacts as long as they involve matters idiosyncratic to the child and are not public questions (response opportunities) or reading or recitation turns.

Dyadic teacher-child contacts are divided into personal, procedural contacts, work related contacts, and behavioral or disciplinary contacts. They are also separately coded according to whether they are initiated by the teacher (teacher-afforded) or by the child (child-created). The coding also reflects certain aspects of the teacher's behavior in such contacts.

All contacts between the teacher and an individual child that do not involve reading, recitation or a public response opportunity are coded into one of the categories of dyadic contacts (procedural, personal, work-related or behavioral). They are separately coded according to whether the teacher or the child initiated the interaction.

Interactions are coded as <u>teacher-afforded</u> if the teacher gives feedback about work when the child has not solicited it (the teacher either calls the child to come up to his desk or goes around the room making individual comments to the students). <u>Created</u> contacts are not planned by the teacher and occur solely because the child has sought him out; <u>afforded</u> contacts are not planned by the child and occur solely because the teacher initiates them. Separate space is provided for coding <u>created</u> and <u>afforded</u> work related interactions on the coding sheets, and the coder indicates the nature of an individual dyadic contact by where he codes the interaction.

CHILD CREATED CONTACTS

In dealing with child created contacts, the first necessary decision to be made is whether the contact is work-related (having to do with either content or procedure) or personal (relating to procedure or experience sharing).

Child-created contacts (work-related)

There are two types of work-related child-created contacts: content related and procedure related.

Examples:

1. content related
   shows work after finishing
   asks for help with problem
   wants to know how to spell a work
   wants to know if answer is right

2. procedure related
   Asking what page to do, or what problems
   asking permission to read library book
   asking for repetition of assignment
   asking how to title paper

When a child-created work-related contact occurs, the first decision to make is whether it is content-related or procedural. Then there are five columns divided into two sections in which to record the teacher's feedback to the child.

I. Evaluative comments (praise and criticism)

Praise (++) should be coded whenever the teacher make a positive evaluative comment to the child regarding the quality of his work or the effort he is expending.

Examples:

"Your're doing very well. Keep it up."
"I'm very pleased to see you working so hard."
"You got all your math problems correct. That's excellent."

Praise comments are usually said with feeling and often with some

affect such as a smile, a pat on the shoulder, etc.

Criticism (-) should be coded when ever the teacher makes a negative evaluative comment to the child regarding the quality of his work and the effort he is expending. This negative evaluation goes beyond mere disagreement. She may disparage his ability or motivaiton.

Examples:

"You're not trying."
"I told you to do the exercise on page 11. That's page 21."
"Your papers are always messy. You just don't care."

Note that nonevaluative comments, those which have in the past been coded as "feedback" (FB) are not coded at all. The number of times that the teacher gives feedback can be determined by adding the check marks in the section next to the praise and critisism section. This second section will always be coded whenever there is a child-created contact. The praise and criticism columns are coded only when they occur.

2. Extent of teacher feedback to child-created work contacts:

The manner in which the teacher gives feedback,aside from evaluative comments, may be distinguished in any one of the following ways.

Delay: This column should be coded whenever a student attempts to initiate contact with the teacher which is obviously related to work (e.g. he approaches the teacher's desk with his workbook, reader, or a sheet of paper) and the teacher is occupied or hasn't time at the moment to attend to the child and hence, puts the child off. The teacher may tell him to return to his seat that he (the teacher)will get to him later, or to wait his turn in line, etc.

Example:

A student stands by the teacher's desk with a book in hand. The teacher is preparing a note to go to the office. The teacher may look up and say, "I'll get to you in a minute. Please sit down." Or the teacher might simply wave the child away and point to his chair.

Brief should be coded when the interaction between the teacher and child is of very short duration. For example, the teacher may glance at the workbook the child is holding and say "Good!" or "That's fine!". She may respond to a child's question by saying, "Page 5." or "In your Think and Do book." In any case the coder should check brief if the teacher's feedback consists of a short sentence (3 or 4 words) or less.

Examples:

"Good!" would be coded as (++) Brief
"That's terrible!" would be coded as (=) Brief
"OK." would be coded as Brief only.

Long is coded when the interaction exceeds that of a short sentence or phrase, as in the case of Brief. All extended feedback from the teacher should be coded in this column.

Examples:

"That's good. I'm pleased with your work today." would be coded as (++) Long.
"You should have been listening earlier. I told you exactly how to work that problem." would be coded as (=) Long.
"I think you'll find it easier if you use the vocabulary in the back of the book." is coded Long only.

The "don't know" (?) category is added for this coding because frequently the individual teacher-child interaction that occurs in the dyadic contacts will be carried on in hushed tones or across the room from the coder where he cannot hear the content of the interaction. In such cases, where he is unable to code the nature of the teacher's feedback because he cannot hear it, the coder notes the occurrence of the interaction and the fact that it was either teacher-afforded or child-created.

Coders should note that the "don't know" column has a very special and specific meaning for this coding. It should be used only when the coder cannot hear the teacher's feedback. It must not be used when the coder is unsure about whether to code the teacher's feedback as process or product. Thus, use of this column signifies that the coder could not hear the interaction, not that he has difficulty in making a coding decision on the basis of something that he was able to hear.

Child-created contacts - Personal

There are two types of personal child-created contacts: experience sharing and procedure related.

1. Experience sharing

Examples:
Child tells teacher of experience that happened to him over the weekend.
Child tells about event within his family.
Child tells teacher about not feeling well.

All experience sharing contacts are personal ones in which the student approaches the teacher to tell him something that is not related to either classroom work or procedure.

The teacher's feedback might fall into two categories: acknowledge (ACK) or delay (DELAY). The teacher's feedback would be coded as acknowledge if the teacher listens to the student's experience and perhaps comments on it or simply nods her head and acknowledges that she has heard. The teacher's feedback would be coded as DELAY if she indicates to the student that she is unable to listen to his experience or talk to him about it at the time.

2. Procedure-related

Examples:

Procedural interactions created by the child

Wants paper, pencil, eraser, etc.
Seeks permission for washroom, drink, etc.
Finishes work and wants to know what to do
Has wrong book or worksheet and wants to exchange
Tattles on other children
Offers to do a job or errand
Reminds teacher of something or calls attention to something

In this situation, where a request for permission is involved, the teacher's feedback may be one of the following: GRANT, (permission is given), DELAY (teacher signals the child that she cannot deal with him now but will do so later), or NOT GRANT (permission is not given or the request is denied).

TEACHER AFFORDED CONTACTS

Teacher-afforded Contacts (work-related):

The category designations are the same for teacher- afforded work-related contacts as they are for the child-created contacts. The same distinctions apply to the praise (++), criticism (–) and don't know (?) categories for the teacher-afforded situation as for the child-created situation. Also, in terms of extent of teacher feedback to a given child, the brief and long designations apply here. The one difference is that under teacher afforded contacts there is added an Observes column and the Delay column is omitted.

Observes is coded whenever the teacher is moving around the room glancing at student work, but not entering into verbal interaction. Thus it should not be confused with don't know (?) simply because no verbal interaction takes place.

Example:

The teacher is walking around the room and stops at Susan's chair and looks over Susan's shoulder at her workbook. The teacher remains here looking for 10 seconds or so and then moves to another part of the room.

The coder should check the observe column only when the teacher stops and looks at a child's work. It should not be coded if the teacher is merely moving around the room scanning as she moves. Also, if the teacher stops and observes but then says something to the child, brief or long should be coded and not observe.

Teacher Afforded Contacts - Personal

As in the case of child created personal contacts, these contacts do not involve either work content or procedure. They are of a strictly personal nature and might involve such things as a teacher asking a student about an experience he had on the weekend, about the health of some member of the student's family, or perhaps about what happened at home the night before to make the child so moody or sleepy. In the case of a contact of this sort, a check would be placed in the column marked PERS.

Teacher-afforded contacts (procedure-related):

Within this category a distinction is made between those afforded procedures which are favors for the teacher,(or those which the child is called upon to do which help with the running of the classroom. The child in this case becomes a "helper".) and those situations which have to do with classroom management or organization. These requests have to do with getting the child ready to work on an assignment.

Examples:

Favor is coded if the teacher asks the child to pass out the crayolas, workbooks, readers; take a note to the office; lead the line to lunch or P.E.; take names when she leaves the room..

Management is coded if the teacher asks the child to cover his paper, sharpen his pencil, get out his math book, change his seat in the classroom.

Thank you is checked if, in addition to an afforded procedure, the teacher thanks the child for performing the favor. Thank you's will be heard more frequently in connection with the teacher's request for a favor from the child than in the management situation, however, it would not be impossible for them to occur following management requests.

Examples:

T: Laura, will you pass out the lunch cards, please. (code teacher-afforded procedure, favor)
S: (Passes out cards and sits down)
T: Thank you, Laura. (Check thank you column.)

T: John, get out a clean sheet of paper. (Teacher-afforded procedure, management)
S: (John gets out paper.)
T: (Teacher begins writing on board and turns attention away from John.) (No thank you is coded)

Behavioral Contacts

Behavioral contacts are coded whenever the teacher makes some comment upon the child's classroom behavior. They are subdivided

into praise, non-verbal intervention, warnings, and criticism.

Behavioral evaluation contacts are considered to be teacher afforded, although they usually occur as reactions to the child's immediately preceding behavior. Nevertheless, they are teacher-afforded in the sense that the child usually does not want and does not expect the interaction, and the teacher chooses to single the child out for comment. The conditions for coding this category are: (a) the teacher singles out the child for comment upon his classroom behavior; (b) the interaction concerns only his behavior and does not involve praise or criticism in connection with work-related or procedural contacts as defined above. Some behavioral criticism may occur in work-related and procedural contacts, and in those situations it appears in the coding for work-related and procedural interactions. The category of behavioral interactions is used only for those instances in which the teacher singles out the child for comment solely on the basis of wanting to discuss his classroom behavior. Work-related or procedural matters are not involved.

Most of the evaluations coded in this category will occur in connection with the child's attention, cooperation, and performance of classroom rituals, although occasionally they will be comments made in relation to the child's academic work. In the latter case, there will be evaluations made at the conclusion of a lesson or a school day in which the teacher refers to the child's general performance. Teacher praise or criticism of this sort would not be picked up by the coding system otherwise, since it does not occur as part of a response opportunity, reading or recitation turn, and other dyadic contact.

Praise

This category will be used relatively infrequently with most teachers, although it will occur. Occasionally children will be singled out for special praise when they have done a particularly good job of cleaning up their desks, sitting up straight, keeping

quiet in preparation for leaving the room, etc. Praise coded in this category will also sometimes occur after activities but not in relation to specific responses during those activities ("Johnny really knew all his words today -- he must have studied real hard last night."). Idiosyncratic teacher euphemisms that carry the same sorts of meanings as the preceding examples are also considered to be praise ("Johnny has on his listening ears today," "Mary knows how to get ready to go."). Whenever the teacher singles out a child for such praise, coders should check the praise (++) column under behavioral teacher-afforded contacts.

Examples:

1. Praise

"John is all ready." (has his hands folded, is sitting up, etc.)
"John's got his listening ears on today."
"John, you really knew your words today, didn't you?" (said after the lesson rather than during a response opportunity)

Non-Verbal Intervention is included in this system to account for those situations in which the teacher takes steps to correct a behavioral problem, however, she does so without disrupting the whole class. She may move close to a child who is talking; she may tap a child on the shoulder who is daydreaming and point to his book; or she could turn a child around in his seat when he is facing the wrong way and looking at his neighbor. These are cases where the teacher does intervene, but does so inaudibly with a minimum of disruption.

Warning

This category and the following one refer to teacher behavior in singling out for comment a child engaging in inappropriate or undesirable classroom behavior. Comments and audible gestures, such as tapping a ruler on the desk or finger snapping, which function as warnings and which do not include elements codable as criticism are coded in the warning category, while negative reactions which do contain criticism are coded in the criticism category to be described below. Usually teachers' warnings will occur in situations in which the child is doing something that is not necessarily or always prohibited but which is troublesome at the moment. In such instances the teacher will single out the child to inform him that his present behavior is inappropriate, but will do so

without communication of rejection or anger as in criticism. Examples of this are as follows: "Johnny, you're getting too noisy" "Try to figure out the answer on your own -- don't copy off your neighbor" "Johnny, you can talk to Mary if you want to, but stay in your seat."

The lines of demarcation between procedural-afforded interactions and behavioral warnings, and between behavioral warnings and behavioral criticisms, are sometimes difficult to discern.

Sometimes the same or nearly the same words could be coded in either category, with the decision being made on the basis of the nonverbal expressive and gestural components of the teacher's message. Behavioral instructions given to the child merely in the interest of information or classroom management and without any connotation of warning or criticism would be coded as afforded procedural contacts. The same instructions given in a slightly different context which connoted more of a warning and perhaps implied that the child should know better ("John sit down -- Mary can't see when you stand up like that.") would be coded as behavioral warnings. If the same sentence were snapped at the child or delivered with anger or exasperation, it would be coded as behavioral criticism.

Warning

"You're too loud, John."
"Stay in your seat, John."
"Raise your hand if you want to answer."
"Try to figure out the answers yourself."
Teacher snaps her fingers at a child who is not paying attention.

3. Criticism

"Keep your voice down, John!" (with irritation)
"John -- sit down!!"
"I told you to raise your hand first -- don't you listen?"
"Keep your eyes to yourself, John, his paper is none of your business."

BEHAVIOR-RELATED CONTACT ERRORS

When coding a desist event (the stopping by the teacher of misbehavior), we would like to obtain a measure of her effectiveness of method. We can do this by recording certain errors which she may make when halting a deviancy, target, timing, overreaction, and shift errors.

A TARGET ERROR is coded when the desists the wrong student or desists an onlooker or contagee rather than an initiator. For example, all is quiet until Mary whispers to Jane. Jane then says something back to Mary, and Jami turns around to listen. "Jami, turn around and get back to work," the teacher says. A target error is also coded if one deviancy is stopped while another, more serious misbehavior was allowed to continue. Thus, if Bob were tossing paper airplanes while the teacher was chastizing Mary and Jane, that would be a target error.

A TIMING ERROR is coded whenever misbehavior increases in seriousness or spreads to more children before being halted. For instance, Jack whispers to Craig, who whispers to Jim, and then Barney whispers to Craig, and then the teacher desists. Also, if John says something to Clem, Clem pokes John, John pokes Clem, and they start to pull each other's shirts off before the teacher stops them, the desist is considered "too late" because the misbehavior increased in seriousness before she acted.

Occasionally the coder will be busy coding other information prior to a desist and will not have been able to gather sufficient evidence to judge whether or not a target or timing error has been made. In these cases, place a check in the "?" column. This refers only to the target and timing error columns, since the coder can usually tell if an overreaction or shift error has been made without having previously observed the children.

An overreaction error occurs whenever a teacher overreacts to a deviancy. For example, if Mary and Jane stop talking and get back to work before the teacher desists, OVRCT should be coded; since the misbehavior had already stopped, the teacher should have ignored it. It would not be a timing error because the misbehavior does not spread or become more serious. Another instance: The class is in a discussion and Hercules is talking when the teacher says, "Hercules, stop talking. This is not a playground, it's a classroom, and we're supposed to be working. If you talk, you disturb your neighbors so they can't work. So let's all get back to work and be quiet." This overdwelling on the point is an overreaction error because the teacher's action is more than sufficient to stop the talking. Of course, if a serious deviancy such as a fight occurs, stern action would be appropriate since the class has already been disturbed. Even so, the teacher can commit an overreaction error by criticizing the deviants beyond the point where they understand and conform.

The "NOERR" column is checked whenever the teacher desists without committing any of the four errors. As mentioned before, the "?" should be used and the "NOERR" column not checked if the coder is not sure that a target or timing error has not occurred.

School_____ Date___/___/___ Start_____ PAGE_____

Teacher_____ Observer_____ Stop_____ OF_____

RESPONSE OPPORTUNITIES

TIME	CHILD				QUEST				ANSWER					ACADEMIC									SUSTAINING		
														TERMINAL					FEEDBACK						
	PRE	NVOL	VOCAL	CALL	PCSS	PCRSD	CHOIS		+	±	-	DK	NR	+ +	- -	0	PCSS	GIV ANS	ASK OTH	CALL			REPT	REPH or CLUE	NEW Q
___	___	___	___	___	___	___	___		___	___	___	___	___	___	___	___	___	___	___	___			___	___	___

School_____ Date___/___/___ Start_____ PAGE_____

Teacher_____ Observer_____ Stop_____ OF_____

SUBJECT_____ TYPE OF ACTIVITY_____ TIME BEGUN_____

SELF

SUBJECT			NON-SUBJECT	
PREF	EXP	?	PREF	EXP

OPINION

NR	+	-	0	DISAG	ACPT	INTEG
	+	-				

CHILD-CREATED CONTACTS

WORK-RELATED								PERSONAL-RELATED					
CONT	PROC	+	-	DELAY	BRIEF	LONG	?	EXP	PROC	ACK	GRANT	DELAY	NGRAN
		+	-										

TEACHER-AFFORDED

WORK-RELATED						PROCEDURE			
+	-	?	OBSV	BRIEF	LONG	PERS	FAVOR	MNGMT	THNKS
+	-								

CONTACTS

BEHAVIOR-RELATED								
+	NVINT	WARN	-	NOERR	TARG	TIM	?	OVRCT
+								

Appendix B

CURRICULUM AREA METHODS AND MATERIALS

MECHANICS OF CODING:

This sheet is designed to be continuously coded during curriculum related activities such as reading, math, spelling, science, etc. There are three types of categories (A. Teaching, B. Methods, and C. Materials), each with eight to ten subcategories which are defined in the next section. In addition, an entry should be made to indicate the degree of individualization, according to the following code:

I - teacher behavior is directed toward an individual, she is requesting individual work or responses, or materials are individually tailored for the various individual children

P - teacher behavior is directed at a subset of the total instructional group, or she is having the children work in pairs or small groups

G - teacher behavior is directed toward the entire group she is working with, or the group response is chorused, or the group is working together as a whole on some activity; for materials, use this category when all children have the same materials even though each child has his own copy

Time coded usually refers to category A. When #8 in this category (follow-up activity) is done as seatwork it will not be timed, but should be listed at the end of the lesson with as many subcategories from C as apply. When the follow-up activity is done in the group, enter the time in the same way as for other A categories. Sometimes you will need to enter the time to show a change in methods (some B category) even though the A category has not changed; if so, repeat the A category entry and mark the appropriate B and C entries.

There will not always be entries in column C as physical materials may not be used. For example, if the teacher is just talking to explain directions for an activity, the B entry would be #2 and there would be no C entry.

If the lesson is long and varied you may need to go on to a

second sheet. Enter the stop time of the lesson at the end, and begin each new lesson or group session with a new sheet.

The I-P-G dimension may be different for the different categories on the same line. For instance, if the teacher is working with the whole group, calling on children to recite individually, and each child has a copy of the same book, the A entry would be $\overset{3}{2}$G, the B entry would be 5I, and the C entry would be 1G.

Elapsed time can be figured and entered after the total observation session is over. A separate sheet will be used to total the various subcategories. You may need to start a new line and make new entries when less than a minute has passed. This will be corrected when elapsed time is figured.

DEFINITIONS OF THE CATEGORIES:

General information in the heading - Always fill in the complete heading at the top of the page. For area and purpose of activity enter the subject matter area and, if there is occasion, the special purpose of the lesson (ex: arithmetic, number facts drill). Group size refers to the number of children in the group. By the end of the session you should be able to judge the rank out of the number of groups you saw.

A. Teaching categories - generally refers to parts of a lesson.

1. Review of old material refers to going over materials which you have not seen taught to the group. You may find this at several points in the lesson (ex: in a reading group when old vocabulary is reviewed before new is presented, and then again later in a new phase of the lesson when there is discussion of what was read yesterday before beginning to read new material today). Some teachers may never use this category at all.
2. Presentation of material is the actual teaching of something new. The teacher may cue this category for you by referring to moving on

to something new. Other times you will have to infer it from the behavior of the children (ex: only a few children able to respond correctly, slow or stumbling responses, puzzlement followed by "aha!" responses). Include in this category the first time going through a reading story.

3. Practice refers to still-in-the-group supervised practice with concepts or materials you have just seen presented. It begins at the point where the teacher appears to have made the judgment that most of the kids have gotten the point and so now she begins to have them practice it. In reading the teacher may stop telling what syllable is accented and begin to drill the children on doing this, or the group may go back to the beginning of the day's reading selection and re-read for fluency or detail. In math the students may work oral examples of the principle presented. Teacher explanation should be minimal, only for occasional errors or a few of the children. If the practice breaks down because the children don't really understand and the teacher begins to re-present the material to the whole group, go back to the presentation of material category (#2).

WHEN IN DOUBT BETWEEN #1, #2, and #3, use #2.

4. Summarizing review refers to situations in which the teacher asks questions or gives comments which in some way synthesize or help the student to organize the content of the lesson. For example, if the reading lesson included work on the effect of a silent "e," at the end of the lesson the teacher may ask one child, or the group in chorus, to give her the rule for short "e" at the end of a word. Another situation would be listing the four things the fox did in the story, or three rules for writing equations. Some-

times the teacher may simply tell or ask a student to tell what the lesson was about today. This may not be a frequently occurring category.

5. Teacher evaluation is a general performance evaluation given by the teacher. Do not attempt to code brief statements of "Good!" or "Nice work!" but do include more definite periods of this type of evaluation, as well as any time the teacher spends in the group correcting the children's work.
6. Student self-evaluation refers to those student self-evaluations elicited by teacher prompting. In other words, she is intentionally trying to get them to develop their own skills of self-evaluation. It includes when the teacher has the children correct their own written work. Do not use this category for cases in which the students spontaneously offer self comments.
7. Follow-up instructions refers to presentation of and directives pertaining to any follow-up work (seatwork, homework, activities) which will give additional practice on the material you saw taught in the group session, but will be done independently by the children.
8. Follow-up activity is the independent practice of material or concepts taught in the group session. (Note: Do not confuse independently with individually, which applies to the I -G column. The latter would mean that the materials are individualized.) There will be no time code for this category, simply a tally mark for as many column C materials as are applicable, if the students leave the group to do the work. If they stay at the group area and either correct their work or turn it in to be corrected, enter the time in the same manner as for other A categories.

The I-P-G column for the A category should always reflect whether the teacher's attention is directed toward the whole group, or if she sets some of the children to working independently so that she can work more individually with a subset of the group (P) or an individual (I). Watch for times when she sends the group back to their seats to work independently and retains one or more children for more help.

B. Methods

1. Demonstration, diagram includes situations when the teacher "models," that is, she demonstrates or illustrates what is to be done. For example, she may read a sentence or paragraph or may work a sample problem on the board. Very occasionally you may need to use this category for a child's recitation turn, if the teacher specifically has a child demonstrate ("John, you show how it should be done."), but do not use it for an ordinary practice turn or when a second child gives a correct answer which another child has missed.
2. Lecture is when the teacher is just talking, giving information or instructions, with little illustration or example.
3. & 4. One of the two discussion categories should be used whenever the group is talking about a story, problems, etc., without having to decide upon correct answers. This includes situations where the children are correcting (evaluating #6 in A) their own work together in the group. Focussed discussion involves the teacher using prepared, sequenced questions to help students arrive at conclusions, or to understand verbal material. Unfocussed discussion refers to rambling conversation, without any apparent objective, perhaps dominated by student digressions.
5. Pupil reading/recitation is when the children take turns reading,

doing math problems, reading the filmstrip titles, etc., with the intention that the child's performance is primarily a learning experience for himself rather than an example for the other children. This will probably be the most frequent category in which the "I" is used. If the reading is silent, indicate that in parentheses: 5I (silent).

6. Drill should be used when the practice is aimed at speed and automaticness without any particular effort to think about the situation.

7. Problem solving is process oriented practice, most probably some type of opportunity to transfer or apply what has been learned. This category should be used with workbooks, problems on the board, etc.--any thinking situations in which the children are to come up with answers. (But remember that correcting problems previously done is considered discussion, #3 or #4.)

8. Dead spots refer to situations in which the flow of the group's activity is broken because the teacher attends to something else (looks up something in the manual, gets materials, is interrupted by a student in the class, disciplines someone outside the group, or within it if this is disruptive of the group). Do not count episodes initiated from outside the classroom (PA announcements, messengers, etc.).

9. & 10. Patterned turns and non-patterned turns indicate if the teacher calls on the children in any recognizable sequence (so that they can safely "not think" for some turns or questions). These two categories will always be double coded with numbers 3 through 7 in column B.

The I-P-G dimension for column B can usually be decided by whether the children have individual turns or the whole group is responding jointly. Discussion, however, would be group if questions are directed generally and everyone has a chance to talk, even though only one person talks at a time.

There will often be double codings in column B. For example, the group may take turns reading workbook selections and telling the answer, with the children each reading in turn going around the group: this would be coded 7G, 5I, 9, all in column B. In these types of situations, make entries on separate lines of column B. You do not need to repeat the A entry, but be sure to start the next time entry on a totally new line. Please always make a decision between discussion (talking about) and problem solving (thinking of an answer): do not double code #3 and #7 in the B column. #5 may be double coded with #7, if the children are taking turns in the problem solving, but do not double code #5 with discussion (#3 or #4) or drill (#6).

C. Materials

1. Standardized refers to published, pre-packaged, purchasible materials, including using the exercises directly out of the teacher's manual.
2. Teacher-created refers to materials specifically designed for the group by the teacher; it is usually distinguishable by being hand-written or handmade.
3. Seatwork/homework refers to specifically assigned independent work, to be checked at some point by the teacher.
4. A/V aids: overhead projector, films, records, filmstrips, records, etc.
5. Games/activities may or may not be checked later by the teacher, but are distinguishable as being more "fun" than assignment.

6. Learning centers refer to areas in the room set up for specific activities, where the children can do something someplace other than at their own desks.
7. Excursion, either planned or mentioned.
8. Free time: no specific directions are given, or simply "do something when you are finished."

The I-P-G dimension for category C should refer to whether the materials used by the children are differentiated according to their level or interests. If every one has his own copy of the book or materials, but every child has the same thing, code G. If they are reading or playing games in pairs or small groups, code P. If each one reads a different library book or uses a different instructional game, code I.

Column C may also often involve double coding, especially of categories #1 and #2 with the others. As with column B, use as many lines as necessary to indicate all the materials involved, but be sure to start the next time entry on a completely new line.

Note: Sometimes when the children in a group have been set to work independently on a task (8A), the teacher will give instructions or help to individuals (either within the group or in the rest of the class). Since the teacher does not really take over the group again, nor does she really leave it, such teacher behavior should be coded as "intermittant" in the Start Time column, entries made in the regular way in the A,B, and C columns, and time spent entered in the Elapsed Time column.

Start time	A	I P G	B	I P G	C	I P G	Elapsed time
8:50	8	G			4	G	10:00
intermittant	7	I	3	I			1:00
:	6	I	2	I			1:00
9:00							

During a lesson listening on earphones to records, the teacher gives one student additional instructions, and scolds another.

School Lincoln Teacher Noe Gr. 3 Date 3/30 Observer NLM P. 1 of 2

Area & purpose of activity Reading Group size & rank 8 (2 of 3)

A. Teaching categories

1. Review of old material
2. Presentation of material
3. Practice
4. Summarizing review
5. Teacher evaluation
6. Student self-evaluation
7. Follow-up instructions
8. Follow-up activity

B. Methods categories

1. Demonstration, diagram
2. Lecture
3. Focussed discussion
4. Unfocussed discussion
5. Pupil reading/recitation
6. Drill
7. Problem solving
8. Dead spots
9. Patterned turns
10. Non-patterned turns

C. Materials categories

1. Standardized
2. Teacher created
3. Seatwork/homework
4. A/V aids
5. Games/activities
6. Learning centers
7. Excursion
8. Free time

	Start time	Codes A	I/G	B	I/G	C	I/G	Elapsed time
1.	8:30	1	G	6	I	2	G	4:00
2.	:			10				:
3.	8:34	2	G	7	G	1	G	4:00
4.	:			5	I			:
5.	:			10				:
6.	8:38	2	G	5	I	1	G	3:00
7.	:			9				:
8.	8:47	3	P	5	P	1	G	6:00
9.	8:53	5	G	2	G			1:00
10.	8:54	7	G	2	G			5:00
11.	8:59	8	G			1	G	:
12.	:					3	G	:
13.	:							:
14.	:							:
15.	:							:
16.	:							:
17.	:							:
18.	:							:
19	:							:
20.	:							:
21.	:							:
22.	:							:
23.	:							:
24.	:							:
25.	:							:
26.	:							:
27	:							:
28.	:							:
29.	:							:
30.	:							:
31.	:							:
32.	:							:
33.	:							:
34.	:							:

Example: At 8:30 the teacher begins a reading group by drilling the entire group with flashcards she has made up with previous vocabulary words, calling on one child at a time in a non-patterned order. At 8:34 she begins to introduce new vocabulary, writing the words on the board and letting the children call out the words as they recognize them. At 8:38 the children begin to read a new story, reading a paragraph individually in turns going around the group. Two children have particular difficulty, so when they finish one time reading it through (8:47) the teacher divides the group, listening to the two poorer readers while the rest of the group reads it through without direct supervision from her. When this is finished (8:53) the teacher compliments the group on their performance this morning, briefly gives directions for workbook pages, and sends the children back to their seats to do the assignment.

Curriculum Area Methods and Materials
Directions for Tallying

PREPARING THE CODING SHEETS:

1. Go through all coding sheets and be sure there are no entries for time spent taking tests or when a student teacher was teaching. If there are such entries cross them out.

2. Figure total time coded by subtracting beginning time from ending time for each lesson ("Start time" column) and summing for all lessons for that teacher. (Be sure to subtract the amount of time consumed by tests and student teachers.)

3. Fill in the elapsed time column. If there is more than one entry for the same minute of start time, split the time in the elapsed column (e.g., two entries at 8:41 would each be counted as 30 seconds elapsed time; three entries would be counted as 20 seconds each). Elapsed time should equal total time coded.

4. To help handle the scoring of double coding, be sure that any double coding within the A-B-C columns is bracketed. Circle any periods coded as "intermittant."

TALLYING:

5. Enter each unit of elapsed time in the proper category of A-B-C/ I-P-G (except B8, B9, and B10, which have no I-P-G designation). Enter B5 and B5s (silent reading) separately. For non-supervised independent activity (A8 not timed), tally the materials used on the bottom C line.

6. Count the number of entries for each category, write the total above the line at the top of the category (line labelled "f") and sum across the I-P-G categories for a grand total frequency for each numbered category.

7. Total the time entries for each column at the bottom. Sum across the I-P-G categories for a grand total of time for each numbered category.

8. From the numbers at the bottom of each column (excluding B8, B9, and B10) total the I entries, the P entries, and the G entries for A, for B, and for C.

9. Sum the time total for each numbered category for A, for B, and for C to get total lesson time (A), total teaching time (B), and total materials time (C); these times will differ from total time coded (step #2) because of double coding or no coding. For A and C this time should equal the sum of the I-P-G totals; for B it should equal the sum of the I-P-G totals plus categories 8, 9, and 10.

10. Sum the I-P-G across A-B-C to get total I-P-G.

11. To figure effects of double coding, go through the coding sheets and figure the amount of A entries, B entries, and C entries which are not coded, are single coded, and are multiple coded. Within

A, B, and C the total of no entry + single coding + multiple coding should always equal total time coded.

Example:

Start time	A	I / D / G	B	I / D / G	C	I / D / G	Elapsed time
9:40	8	G			3	G	10:00
intermittent	6	I	3	I			1:00
:	7	I	2	I			2:00
9:50							:

In this case the one minute of A6I and two minutes of A7I are double coding. The B3I and B2I entries are single coded. There are seven minutes of single coded A and three minutes of multiple coded A; seven minutes of no B and three minutes of single coded B; ten minutes of multiple coded C. Total time coded is ten minutes. (Lesson time is thirteen minutes; teaching time is three minutes; materials time is twenty minutes.)